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## MINISTRY OF TRANSPORT

(Transport Wing)

NOTIFICATION

MERCHANT SHIPPING

*New Delhi, the 12th January, 1957*

S.R.O. 330.—In exercise of the powers conferred by Section 145 of the Indian Merchant Shipping Act, 1923 (21 of 1923), the Central Government hereby makes the following Rules, the same having been previously published as required by the said section, namely:—

### PART I GENERAL

1. **Preliminary.**—(i) These rules may be called the Indian Merchant Shipping (Construction and Survey of Passenger Steamers) Rules, 1956.

(ii) They shall come into force on the 1st February, 1957.

(iii) These rules shall apply to all steamships for which a certificate of survey is required under the Indian Merchant Shipping Act, 1923 (21 of 1923). Provided that the Central Government may exempt any ship the keel of which was laid before the date on which these rules come into operation, not being a ship converted on or after that date for service as a passenger steamer, from the requirements of these rules to the extent that it is satisfied that compliance therewith is unreasonable or impracticable in the circumstances.

(iv) Except where otherwise provided the provision of these rules relating to steam ships apply equally to ships propelled by Electricity or other Mechanical power.

2. Every steamship for which an application is made for the issue of a certificate of survey or a Safety Certificate shall be surveyed by a surveyor or surveyors his or their satisfaction before a declaration of survey is granted.

3. The survey of steamships shall be conducted at the Ports of Calcutta, Bombay, Madras, Visakhapatnam, Cochin, Tuticorin, Mandapam and at such other ports as the Central Government may appoint to be ports of survey.

4. (i) The survey shall be arranged on the application of the owner or master or agent.

(ii) Every application shall be accompanied by a fee calculated on the tonnage of the steamship, in accordance with the rates specified in the Sixth Schedule to these rules.

(iii) The application shall be lodged between the hours of 10 a.m. and 5 p.m. on any day except Sundays and holidays, and not later than 72 hours before the hour at which it is desired that the survey shall commence. At the ports of Calcutta, Bombay and Madras the application shall be lodged at the office of the Principal Officer, Mercantile Marine Department; for the ports of Visakhapatnam and Cochin at the office of the Surveyor in Charge and at the ports of Tuticorin, Mandapam and other ports of survey, at the office of the Principal Officer of the district concerned.

5. The application for Survey shall be accompanied by such plans of the steamship as the Central Government may require. The plans shall contain such information as is necessary for the full consideration of the strength of the ship and the proposals for complying with the requirements of these rules.

6. (i) On receipt of the application for survey and of the survey fee the officer receiving the same shall deliver to the applicant a receipt for the fee so paid and an intimation that the application has been received.

(ii) On receipt of an application for the survey of a ship, other than a ship which is to be surveyed during construction, a list of the requisite preparations for the survey of the ship shall be supplied to the applicant.

7. On receipt of an application for survey a survey shall be made by the Surveyor or Surveyors on any day in the year, except a Sunday or a Government holiday, that is Bank Holiday (1st January), Republic Day, Holi, Id-ul-Fitr, Independence Day, Dussera, Mahatma Gandhi's Birthday, Diwali and Christmas Day.

Provided that, if circumstances admit and if so required by such application, a survey may be made on a Sunday or a Government holiday on payment of a fee of Rs. 100 in addition to such fees as may be payable in respect of the survey under these Rules.

8. (i) If the requisite preparations to enable the Surveyor to carry out the survey have not been made on the day and by the hour mentioned in the application for a survey, the Surveyor may fix some other date and hour for the survey.

(ii) If the Surveyor is unavoidably prevented for being present at the time fixed then the earliest possible information shall be sent to the applicant, and some other time convenient both to the applicant and to the Surveyor shall be fixed for the survey.

9. (i) Every steamship to which these Rules apply shall be subjected to the surveys specified below:—

(a) A survey before the ship is put in service.

(b) A periodical survey once every twelve months.

(c) Additional surveys, as occasion arises.

(ii) The surveys referred to above shall be carried out as follows:—

(a) The survey before the ship is put in service shall include a complete inspection of the hull, machinery and equipments, including the outside of the ship's bottom in dry dock and the inside and outside of boilers. This survey shall be such as to ensure that the arrangements material, scantlings of the hull, boilers, and their appurtenances, main and auxiliary machinery, life-saving appliances, fire appliances and other equipments fully comply with such of these rules as are applicable in her case. The survey shall also be such as to ensure that the workmanship of all parts of the ship and her equipments are in all respects satisfactory.

Provided that the bottom of the ship which has been surveyed during the construction need not be examined in dry dock after launching if it has been examined by a Surveyor before the ship is launched, unless he has special reasons for considering it necessary.

Provided further that the survey of a ship shall not be undertaken after the hull is complete, painted and cemented, without the sanction of the Central Government.

(b) The periodical survey shall include an inspection of the whole of the hull, boilers, machinery and equipments, including the outside of the ship's bottom in dry dock. The survey shall be such as to ensure that the ship, as regards the hull, boilers and their appurtenances, main and auxiliary machinery, life-saving appliances and other equipments, is in satisfactory condition and fit for the service for which she is intended, and that she complies with the requirements of such of these rules as are applicable in her case.

(c) A survey either general or partial, according to the circumstances, shall be made every time an accident occurs or a defect is discovered which affects the safety of the ship or its efficiency or completeness of her fire and life-saving appliances or other equip-

ments, or whenever any important repairs or renewal are made. The survey shall be such as to ensure that the necessary repairs or renewals have been effectively made, that the material and workmanship of such repairs or renewals are in all respects satisfactory and that the ship is fit for the service for which she is intended.

10. After the survey of the ship as provided in clause (a) of the sub-rule (ii) of rule 9 of these rules has been completed no change shall be made in the structural arrangements, machinery, equipments, etc. covered by the survey, without the sanction of the Central Government.

11. If a surveyor finds that any defect exists in the hull, machinery or equipments of a steamship he shall, before refusing to give a Declaration of Survey regarding the ship under section 134 of the Act, address a letter to the owner or master of the steamship pointing out such defect and the repairs, etc., necessary to make good the same. If the surveyor be subsequently informed by the owner or master of the steamship that the requisite repairs, etc., have been executed, he shall pay one or more extra visits to the steamship, as may be necessary, and thereafter may either give or refuse a declaration of survey, as he shall think proper.

12. A Declaration of Survey shall not be granted for a steamship of which the outside of the hull and fittings have not been examined in dry dock during the twelve months preceding the date of survey and in no case shall such Declaration be granted for a period greater than twelve months from the date of the last outside examination of the hull and fittings, without the sanction of the Central Government.

13. The officer to whom a declaration of survey shall be sent in accordance with sub-section (i) of section 135 of the Act by the owner or master to whom it is given, shall be the Principal Officer, Mercantile Marine Department, at the ports of Calcutta, Bombay or Madras; the Principal Officer, Mercantile Marine Department, Madras, for the ports of Mandapam, Visakhapatnam, Cochin and Tuticorin and the Port Officer at other ports of survey.

14. The notice to be given to the owner or master of a steamship under sub-section (3) of section 136 of the Act shall be given at the ports of Calcutta, Bombay and Madras by the Principal Officer, Mercantile Marine Department; at the port of Mandapam, Visakhapatnam, Cochin and Tuticorin by the Principal Officer, Mercantile Marine Department, Madras, and at other ports of survey by the Port Officer concerned.

15. (1) If during the currency of a valid Certificate of Survey granted in respect of a steamship by the United Kingdom Ministry of Transport, or by any British Colonial Government, or by any Government whose certificates of survey are accepted under the provisions of the Indian Merchant Shipping Act, 1923 (21 of 1923), and application is made by the owner or master thereof to carry passengers in addition to the number prescribed by the said certificate, the survey of the ship shall consist only of the survey of such parts as are concerned in the carriage of additional passengers.

(2) The fee payable for a survey of the nature referred to in sub-rule (1) of this rule shall be Rs. 48.

16. (1) If a visit from a surveyor is necessary while a certificate of survey or a safety certificate is in force, a fee at the rate of Rs. 48 shall be payable for every visit that the surveyor makes.

(2) The fee for an intermediate survey for a Docking Certificate made at the owner's request of a steamship holding a safety certificate or a certificate of survey issued by the Central Government, the United Kingdom Ministry of Transport or British Colonial Government shall be Rs. 64. This fee shall be for the complete survey for a Docking Certificate and not per visit.

17. Overtime fees shall be charged in respect of surveys or inspection, wholly or partially carried out between the hours of 5 p.m. and 7 a.m. in accordance with the rates specified in the Sixth Schedule to these rules.

18. All correspondence relating to the survey of steamships shall be addressed as follows:-

- (a) At the ports of Calcutta, Bombay and Madras.—To the Principal Officer, Mercantile Marine Deptt.
- (b) At the ports of Cochin and Visakhapatnam.—To the Surveyor in Charge, Mercantile Marine Deptt.

(c) At the ports of Mandapam, Tuticorin and other ports of survey—To the Principal Officer of the District concerned.

**19. Definitions and Interpretation.**—In these rules, unless the context otherwise requires, the following expressions have the meanings hereby respectively assigned to them:—

“the Act” means the Indian Merchant Shipping Act, 1923 (21 of 1923);

“Approved” means approved by the Central Government;

“Berthed passenger” means a passenger accommodated in a compartment containing not more than six berths;

“load line rules” means the Indian Merchant Shipping (Load Line) Rules, 1934;

“motor ship” means a ship propelled by internal combustion engines;

“surveyor” means a surveyor appointed under section 129 of the Act;

“‘A’ class division” means a bulkhead or part of a deck, in either case complying with such of the requirements of Rule 59 of these rules as are expressed to apply to “A” class divisions;

“accommodation space” includes:—

(a) passenger space,

(b) crew space,

(c) offices,

(d) pantries, and

(e) space similar to any of the foregoing, not being service spaces or open spaces on deck,

“‘B’ Class Division” means a bulkhead complying with such of the requirements of Rule 59 of these Rules as are expressed to apply to ‘B’ class divisions;

“Breadth of the Ship” means the greatest moulded breadth at or below the ship’s deepest sub-division load water line.

“bulkhead deck” means the uppermost deck upto which transverse watertight bulkheads are carried;

“cargo space” in part V of these Rules means space appropriated for cargo, other than mail and bullion, and trunks leading to such spaces;

“control station” includes:—

(a) a radiotelegraph room;

(b) any other enclosed space which houses

(i) a compass, direction-finder, radar equipment, a steering wheel or other similar equipment used in navigation;

(ii) a central indicator connected with a system for the detection of fire or smoke; or

(iii) an emergency generator;

“crew space” means crew accommodation provided exclusively for the use of the crew;

“criterion numeral” in relation to any ship means the criterion numeral of the ship determined in accordance with such of the provisions of the First Schedule to these Rules as apply to that ship;

“draught” means the vertical distance from the moulded base line amidships to a sub-division load water line.

“factor of sub-division” in relation to any ship or portion thereof means the factor of sub-division determined in accordance with such of the provision of the First Schedule to these Rules as apply to that ship or portion as the case may be;

“floodable length” in relation to any portion of a ship at any draught means the maximum length of that portion having its centre at a given point in the ship which, at that draught and under such of the assumptions of practicability set forth in the first schedule to these Rules as are applicable in the circumstances, can be flooded without submerging any part of the ship’s margin line when the ship has no list;

"incombustible material" means material which when heated to a temperature of 1382°F (750°C) neither burns nor gives off inflammable vapours in sufficient quantity to ignite at a pilot-flame, and the expression "combustible material" shall be construed accordingly;

"independent power pump" means a pump operated by power otherwise than from the ship's main engine;

"length" in relation to ship means the length of a ship measured between perpendiculars taken at the extremities of the deepest sub-division load water line;

"machinery space" in every Part of these rules, other than Parts V and V(A), means space extending from the moulded baseline of the ship to the margin line and between the extreme transverse watertight bulkhead bounding the spaces appropriated to the main and auxiliary propelling machinery, boilers, if any and the permanent coal bunkers, if any;

"machinery space" in Parts V and V(A) of these rules includes space in which propelling or refrigerating machinery, boilers, pumps, engineers' workshops, generators, ventilation or air conditioning machinery, or oil filling stations are situated, and trunkways leading to such spaces;

"main circulating pump" means the pump installed for circulating water through the main condenser;

"main vertical zones" means the main vertical zones into which the hull, superstructure and deckhouses of a ship are divided in accordance with paragraph (2) of rule 60 of these rules;

"margin line" means a line drawn at least 3 inches below the upper surface of the bulkhead deck at the side of a ship and assumed for the purpose of determining the floodable length of the ship;

"mile" means a nautical mile of 6,080 feet or 1,852 metres;

"passenger space" means space provided for the use of passengers;

"permeability" in relation to a space means the percentage of that space below the ship's margin line which, on the assumption that it is in use for the purpose for which it is appropriated, can be occupied by water;

"public rooms" includes halls, dining rooms, bars, smoke rooms, lounges, recreation rooms, nurseries and libraries;

"radiotelegraph room" has the same meaning as in the Indian Merchant Shipping (Radio) Rules, 1956;

"Service space" include galleys, main pantries, laundries, store rooms, paint rooms, baggage rooms, mail rooms, bullion rooms, carpenters' and plumbers' workshops, and trunkways leading to such spaces;

"Standard Fire test" means a test which develops in a test furnace a series of time-temperature relationships as follows:—

At the end of the first 5 minutes 1000°F (538°C).

At the end of the first 10 minutes 1300°F (704°C).

At the end of the first 30 minutes 1550°F (843°C).

At the end of the first 60 minutes 1700°F (927°C).

"steamer" includes a ship propelled by electricity or other mechanical power;

"unberthed passengers" Steerage passengers are all passengers who are not cabin passengers and persons should not be deemed cabin passengers unless the space allotted to their exclusive use in the proportion of at least 36 superficial feet to each statute adult;

"sub-division load line" means load lines indicating the depth to which a steamer can be loaded having regard to the extent to which she is subdivided and to the space for the time being allotted to passengers;

"sub-division ... water line" means the water line assumed in determining the sub-division of the ship in accordance with these Rules;

"watertight" in relation to a structure means capable of preventing the passage of water through the structure in any direction under a head of water up to the ship's margin line;

"weather-tight" in relation to a structure means capable of preventing the passage of sea water through the structure in ordinary sea conditions.

**20. Classification of Ships.**—(i) For the purpose of these Rules Passenger ships shall be arranged in classes as follows:—

Class I—Passenger steamers engaged on long international voyages.

Class II—Passenger steamers engaged on short international voyages.

Class III—Unberthed passenger steamers engaged on international voyages.

Class IV—Unberthed passenger steamers engaged on short international voyages.

Class V—Passenger ships, being steam ships other than ships of Class I to IV inclusive engaged on voyages between ports in India, or between any port in India and any port or place in the Island of Ceylon.

Class VI—Passenger ships, being steamships other than ships of Class V engaged on voyages between ports situated in India or between any port in India and any port or place in the Island of Ceylon in the course of which they do not go more than 20 miles from the nearest land.

(ii) For the purposes of this Rule the following expressions have the meanings hereby respectively assigned to them, that is to say:—

"International voyage" means a voyage from one country to which the International Convention for the Safety of Life at Sea, 1948, applies to a port outside such country or conversely; and for this purpose every territory for the international relations of which a contracting Government is responsible or of which the United Nations are the administering authority is regarded as a separate country.

"Short international voyage" means an international voyage in the course of which a ship is not more than 200 miles from a port or place in which the passengers and crew could be placed in safety and which does not exceed 600 miles in length between the last port of call in the country in which the voyage begins and the final port of destination. Notwithstanding anything contained above, Portuguese enclaves situated on the coast line of India shall for the purpose of the above rule be considered as part of India.

**21. Structural Strength.**—The structural strength of every ship to which these Rules apply shall be sufficient for the service for which the ship is intended.

## PART—II

### WATERTIGHT SUBDIVISION

**22. Application of Part II.**—This part of the Rules applies to every ship to which these Rules apply.

**23. Watertight Sub-division.**—Every ship to which this Part applies shall be sub-divided by bulkheads which shall be watertight up to the bulkhead deck, into compartments the maximum length of which shall be calculated in accordance with such of the provisions of the first Schedule to these Rules as apply to that ship. Every other portion of the internal structure which affects the efficiency of the subdivision of the ship shall be watertight, and shall be of a design which will maintain the integrity of the subdivision.

**24. Peak machinery space bulkheads, shaft tunnels, etc.**—(1) Every ship to which this Part applies shall be provided with a collision bulkhead which shall be watertight up to the bulkhead deck and shall be fitted at a distance from the ship's forward perpendicular of not less than 5 per cent of the length of the ship and not more than 10 feet plus 5 per cent, of such length. If the ship has a forward superstructure, the collision bulkhead shall be extended weather-tight to the deck next above the bulkhead deck. The extension shall be fitted directly

over the collision bulkhead below unless it is at least 5 per cent of the length of the ship from the forward perpendicular and the part of the bulkhead deck which forms the step is made weathertight. The plating and stiffeners of such extension shall be constructed in accordance with the provision of the Third Schedule to these Rules as if the extension formed part of a bulkhead immediately below the bulkhead deck.

(2) Every such ship shall be provided with a watertight afterpeak bulkhead and with water-tight bulkheads dividing the space appropriated to the main and auxiliary propelling machinery, boilers, if any, and the permanent, coal bunkers, if any, from other spaces. Such bulkheads shall be watertight up to the bulkhead deck. Provided that the afterpeak bulkhead may be stopped below the bulkhead deck if the safety of the ship is not thereby impaired.

(3) The stern gland of every such ship shall be situated in a watertight shaft tunnel or other watertight space separate from the stern tube compartment and of such a volume that if the tunnel or space is flooded the margin line will not be submerged. The stern tube shall be enclosed in a watertight compartment the volume of which shall be the smallest compatible with the proper design of the ship.

**25. Double bottoms.**—(1) Subject to the provisions of this rule every ship to which these Rules apply shall be fitted with water-tight double bottoms which shall be at least of the following extent:—

- (a) in ships of 200 feet but less than 249 feet in length; from the machinery space to the collision bulkheads or as near to that bulkhead as is practicable;
- (b) in ships of 249 feet but less than 330 feet in length from the collision bulkhead to the afterpeak bulkhead or as near to those bulkheads as is practicable, but not necessarily in the machinery space;
- (c) in ships of 330 feet in length and upwards; from the collision bulkhead to the afterpeak bulkhead or as near to those bulkheads as is practicable.

(2) When a double bottom is required by this rule to be fitted in a ship, the inner bottom shall be continued out to the ship's sides in such a manner as to protect the bottom to the turn of the bilge. The inner bottom shall be deemed to be adequate for this purpose if the line of intersection of the outer edge of the margin plate with the bilge plating is not lower at any point than a horizontal plane passing through the point of intersection with the frame line amidships of a transverse diagonal line inclined at 25 degrees to the base line and cutting it a point one-half of the ship's moulded breadth from the middle line.

(3) Wells constructed in the double bottom for the purpose of drainage shall not be larger or extended downwards more than is necessary for such purpose and shall not be less than 18 inches from the outer bottom or from the inner edge of the margin plate. Provided that a well extending to the outer bottom may be constructed at the after end of a shaft tunnel.

(4) Wells for purposes other than drainage shall not be constructed in the double bottom. The Central Government may exempt any ship from the requirements of this paragraph in respect of any well which it is satisfied will not diminish the protection given by the double bottom.

(5) Nothing in this rule shall require a double bottom to be fitted in way of watertight compartments used exclusively for the carriage of liquids, if the safety of the ship will not be impaired in the event of bottom or side damage by reason of the absence of a double bottom in that position.

(6) The Central Government may exempt any ship of Class II from the requirements of a double bottom in any portion of the ship which is subdivided by application of a factor of subdivision not exceeding .5, if it is satisfied that the fitting of a double bottom in that portion of the ship would not be compatible with the design and proper working of the ship.

**26. Stability in Damaged Condition.**—(1) Every ship to which this Part applies shall be so constructed as to provide sufficient intact stability in all service conditions to enable the ship to withstand the final flooding of any one of the main compartments into which the ship is sub-divided in accordance with the provisions of Rule 23 of these Rules. If two of the main compartments being adjacent to each other, are separated by a bulkhead which is stepped, the intact stability shall be adequate to withstand the final flooding of those com-

parts. If the ship's factor of sub-division is .5 or less the intact stability shall be adequate to withstand the final flooding of any two of the main compartments which are adjacent to each other.

(2) For the purposes of this rule, the sufficiency of the intact stability of every such ship shall be determined in accordance with the provisions of the Second Schedule to these Rules.

(3) (a) Every ship to which this Part of these Rules applies shall be so constructed as to keep unsymmetrical flooding when the ship is in a damaged condition at the minimum consistent with efficient arrangements. If crossflooding fittings are provided in any such ship the fittings and the maximum heel of the ship before equalisation shall be such as will not endanger the safety of the ship

(b) If the margin line may become sub-merged during the flooding assumed for the purposes of the calculation referred to in the Second Schedule to these Rules, the construction of the ship shall be such as will enable the Master of the ship to ensure:—

- (i) that the maximum angle of heel during any stage of such flooding will not be such as will endanger the safety of the ship; and
- (ii) that the margin line will not be sub-merged in the final stage of flooding.

(4) (a) There shall be provided in every such ship a document for the use of the Master of the ship containing information as to the use of any crossflooding fittings provided in the ship.

(b) There shall be provided in every ship of Classes I to VI a document for the use of the Master of the ship containing the following additional information:—

- (i) Information necessary for the maintenance of sufficient intact stability under service conditions to enable the ship to withstand damage to the extent referred to in the First Schedule to these Rules; and
- (ii) Information as to the condition of stability of which the calculations of heel have been based, together with the information that excessive heeling might result should the ship sustain damage when in a less favourable condition.

**27. Construction of Watertight Bulkheads etc.**—(1) In every ship to which this Part applies every portion of the ship required by these Rules to be watertight shall be constructed in accordance with such of the requirements of the Third Schedule to these Rules as apply to it.

(2) In every such ship all tanks forming part of the structure of the ship and used for the storage of oil fuel or other liquid including double bottoms, peak tanks, settling tanks and bunkers, shall be of a design and construction adequate for that purpose.

**28. Openings in Watertight Bulkheads, etc.**—(1) In every ship of Classes I to VI inclusive, the number of openings in bulkheads and other structures required by these Rules to be watertight shall be the minimum compatible with the design and proper working of the ship.

(2) So far as practicable, trunks installed in connection with ventilation, forced draught or refrigeration systems in any such ship shall not pierce such bulkheads or structures.

(3) Every tunnel above the double bottom, if any, in such a ship whether for access from the crew space to the machinery space, for piping or for any other purpose, which passes through such a bulkhead shall be water-tight. The means of access to at least one end of such tunnel, if it may be used as a passage at sea, shall be through a trunkway extending watertight to a height sufficient to permit access above the margin line. The means of access to the other end of the tunnel shall be through a watertight door. No tunnel shall extend through the first subdivision bulkhead abaft the collision bulkhead.

(4) Not more than one doorway (other than a bunker or tunnel doorway) shall pierce such a bulkhead in the machinery space in any such ship. If any such bulkhead is pierced by a doorway the doorway shall be placed so as to have the sill as high as possible in the ship.

(5) Doorways, manholes and access openings, shall not be fitted in the collision bulkhead below the margin line of any such ship or in any other bulkhead which is required by these Rules to be watertight and which divides a cargo space from another cargo space or from a permanent or reserve bunker. Provided that the

Central Government may permit any such ship to be fitted with doorways in bulkheads dividing two between deck cargo spaces if it is satisfied that—

- (i) the doorways are necessary for the proper working of the ship;
- (ii) the number of such doorways in the ship is the minimum compatible with the design and proper working of the ship, and they are fitted at the highest practicable level; and
- (iii) the outboard vertical edges of such doorways are situated at a distance from the ship's shell plating which is not less than one-fifth of the breadth of the ship, such distance being measured at right angles to the centre line of the ship at the level of the deepest sub-division load water line.

(6) In every ship of Classes I to VI inclusive, bulkheads outside the machinery space which are required by these Rules to be watertight shall not be pierced by openings which are capable of being closed only by portable bolted plates.

(7) In every ship to which this Part applies—

- (a) (i) valves and cocks not forming part of a pipe system shall not be fitted in any bulkhead required by these Rules to be watertight;
- (ii) if any such bulkhead is pierced by pipes, scuppers, electric cables or other similar fittings, provision shall be made which will ensure that the watertightness of the bulkhead is not thereby impaired;
- (b) The collision bulkhead of such a ship shall not be pierced below the margin line by more than one pipe. Provided that if the forepeak in such a ship is divided to hold two different kinds of liquids, the collision bulkhead may be pierced below the margin line by not more than two pipes. Any pipe which pierces the collision bulkhead of such a ship shall be fitted with a screw-down valve capable of being operated from above the bulkhead deck, the valve chest being secured to the forward side of the collision bulkhead.

**29. Means of closing openings in watertight bulkheads, etc.**—(1) In every ship of Classes I to VI inclusive, efficient means shall be provided for closing and making watertight all openings in bulkheads and other structures required by these rules to be watertight.

(2) Every door fitted to any such opening shall be a sliding watertight door. Provided that in a ship of Class I or in any ship of Class II, which is not required by paragraph 9 of the First Schedule to these Rules to have a factor of subdivision of '5 or less, hinged watertight doors may be fitted—

- (a) In passenger, crew and working spaces above any deck the underside of which at its lowest point is at least 7 feet above the deepest sub-division load water line; and
- (b) in any such bulkhead, not being a collision bulkhead, which divides two cargo between deck spaces.

(3) Every such hinged watertight door shall be fitted with catches capable of being worked from each side of the bulkhead in which the door is fitted.

(4) All doors required by these rules to be watertight shall be secured by means other than bolts, and shall be closed by means other than gravity or a dropping weight.

(5) In every ship of Classes I to VI inclusive, watertight doors fitted in bulkheads between permanent and reserve bunkers, other than the doors referred to in paragraph (4) of rule 30 of these rules shall always be accessible.

**30. Means of operating sliding watertight doors.**—(1) If, in any ship of Class I or a ship of Class II not required by paragraph 9 of the First Schedule to these Rules to have a factor of subdivision of '5 or less any sliding watertight door fitted in a bulkhead (other than a door at the entrance to a tunnel) is in a position which may require it to be opened at sea and the sill thereof is below the deepest subdivision load waterline, the following requirements shall apply—

- (a) If the number of such doors exceeds five, all such doors and all tunnel doors shall be operated by power and shall be capable of being simultaneously closed from a central control situated on the bridge;
- (b) If the number of such doors does not exceed five—
  - (i) if the criterion numeral of the ship does not exceed 30 such doors and tunnel doors shall not be required to be operated by power;

(ii) if the criterion numeral of the ship exceeds 30, all such doors and all tunnel doors shall be operated by power and shall be capable of being simultaneously closed from a central control situated on the bridge. Provided that, if there is only one such door and one tunnel door in the ship, both of which are in the machinery space, they shall not be required to be operated by power.

(2) In every ship of Class II required by paragraph 9 of the First Schedule to these Rules to have a factor of subdivision not exceeding 5, all sliding watertight doors shall be operated by power and shall be capable of being simultaneously closed from a central control situated on the bridge. Provided that, if in any such ship there is only one such door and it is in the machinery space, it shall not be required to be operated by power.

(3) In every ship of Classes III to VI inclusive, when any watertight doors which may be sometimes opened at sea excluding the tunnel door the sill of which is below the deepest subdivision load line, the following rules shall apply—

(a) When the number of such doors exceeds five all watertight doors shall be operated by power and shall be capable of being closed simultaneously from a central control situated on the bridge.

(b) When the number of doors exceeds 3 and does not exceed 5:

(i) if the criterion numeral does not exceed 30 all the watertight doors may be hand-operated.

(ii) if the criterion numeral exceeds 30, all watertight doors shall be operated by power.

(c) When the number of doors does not exceed 3:

(i) if the criterion numeral does not exceed 65, all watertight doors may be operated by hand only;

(ii) if the criterion numeral exceeds 65, all watertight doors shall be operated by power.

(4) If, in any ship of Classes I to V inclusive, any sliding watertight doors which may be opened at sea for the purpose of trimming coal are fitted between bunkers in the between deck below the bulkhead deck, such doors shall be operated by power.

(5) If, in any ship of Classes I to V inclusive, a trunkway, being part of a refrigeration, ventilation, or forced draught system, is carried through more than one transverse watertight bulkhead and the sills of the openings of such trunkways are less than 7 feet above the deepest subdivision load water line, the sliding watertight doors at such openings shall be operated by power.

(6) If a sliding watertight door is required by these Rules to be operated by power from a central control, the power system shall be so arranged that the door can also be operated by power at the door itself. The arrangements shall be such that the door will close automatically if opened at the door itself after being closed from the central control, and will be capable of being kept closed at the door itself notwithstanding that an attempt may be made to open it from the central control. Handles for controlling the power system shall be provided at both sides of the bulkhead in which the door is situated and shall be so arranged that any person passing through the doorway is able to hold both handles in the open position simultaneously.

(7) In every ship of Classes I to V inclusive, there shall be at least two sources of power for opening and closing all sliding watertight doors which are required by these Rules to be operated by power, and each power unit shall be sufficient to operate simultaneously all such doors in the ship. An indicator shall be fitted at the central control to show whether sufficient power is available for such purposes. Any fluid used for the purpose of operating such doors shall be incapable of freezing at the temperatures likely to be encountered on the voyages on which the ship is engaged.

(8) In every such ship every sliding watertight door which is operated by power shall be provided with efficient hand-operating gear which can be operated both at the door itself and at an accessible position above the bulkhead deck. At the position above the bulkhead deck the hand-operating gear shall be operated with an all-round crank motion.

(9) In every such ship if a sliding watertight door is not required to be operated by power, it shall be provided with efficient hand-operating gear with an all-round crank motion, both at the door itself and at an accessible position above the bulkhead deck.

(10) In every such ship the hand-operating gear for operating the sliding watertight door in the machinery space from above the bulkhead deck shall be placed outside the machinery space unless such a position is inconsistent with the efficient arrangement of the necessary gearing.

**31. Watertight doors: Signals and communications.**—(1) Every sliding watertight door fitted in a ship of Classes I to VII inclusive shall be connected with an indicator at each position from which the door may be closed, other than at the door itself, showing whether the door is opened or closed.

(2) There shall be provided in connection with every such door which is operated by power a means of giving an audible warning at the door itself when the door is about to be closed. The arrangement shall be such that one movement at the position from which the door is about to be closed will be sufficient to sound the signal and to close the door, the signal preceding the movement of the door by an interval sufficient to allow the movement of persons and articles away from the door.

(3) If any door required by these rules to be watertight is not capable of being operated from a central control, means of communication by telegraph, telephone or otherwise shall be provided whereby the officer of the watch may communicate with the person responsible for the closing of the door.

**32. Construction of watertight doors.**—(1) Every door required by these Rules to be watertight shall be of such design, material and construction as will maintain the integrity of the watertight bulkhead in which it is fitted.

Any such door giving direct access to any space which may contain bunker coal shall, together with its frame, be made of cast or mild steel. Any such door in any other position shall, together with its frame, be made of cast or mild steel or cast iron.

(2) Every sliding watertight door shall be fitted with rubbing faces of brass or similar material which may be fitted either on the door itself or on the door frame, and which, if they are of less than one inch in width, shall be fitted in recesses.

(3) If screw gear is used for operating such a door, the screw shall work in a nut of suitable non-corrodible metal.

(4) The frame of every vertically sliding watertight door shall have no groove at the bottom thereof in which dirt may lodge. The bottom of such a frame, if it is of skeleton form, shall be so arranged that dirt cannot lodge therein. The bottom edge of every such door shall be tapered or bevelled.

(5) Every vertically sliding watertight door which is operated by power shall be so designed and fitted that, if the power supply ceases, there shall be no danger of the door dropping.

(6) Every horizontally sliding watertight door shall be so installed as to prevent its moving if the ship rolls, and if necessary a clip or other suitable device shall be provided for that purpose. The device shall not interfere with the closing of the door when the door is required to be closed.

(7) The frame of every watertight door shall be properly fitted to the bulkhead in which the door is situated, and the jointing material between the frame and the bulkhead shall be of a type which will not deteriorate or be injured by heat.

(8) Every watertight door, being a coal-bunker door, shall be provided with screens or other devices to prevent coal from interfering with its closing.

**33. Openings in the shell plating below the margin line.**—(1) In every ship to which this Part applies, the number of side scuttles, scuppers, sanitary discharges and other openings in the shell plating below the margin line shall be the minimum compatible with the design and proper working of the ship.

(2) The arrangements for closing each such opening below the margin line shall be consistent with its intended purpose and shall be such as will ensure watertightness.

(3) (a) In every ship of Classes I to V inclusive the number of side scuttles below the margin line which are capable of being opened shall be the minimum compatible with the requirements for the proper operation of the ship.

(b) If in a between decks of such a ship the sills of any side scuttles are below a line drawn parallel to the bulkhead deck at side and having its lowest point two and one-half per cent. of the breadth of the ship above the deepest

subdivision load water line, every side scuttle in that between decks shall be of a non-opening type. If in a between decks of such a ship all the sills of the side scuttles are above the aforesaid line, every side scuttle in that between decks shall be either of a non-opening type or incapable of being opened except by a person authorised to do so by the master of the ship.

(4) In every ship of Class VI, to which this Part of these Rules applies all side scuttles below the margin line shall be of a non-opening type.

(5) In every ship to which this Part applies, every side scuttle below the margin line shall be fitted with an efficient hinged deadlight permanently attached so that it can be readily and effectively closed and secured watertight. Provided that in ships of Classes I and II abaft a point one-eighth of the length of the ship from the forward perpendicular and above a line drawn parallel to the bulkhead deck at side and having its lowest point at a height of 12 feet plus two and one-half per cent. of the breadth of the ship above the ship's deepest subdivision load water line, deadlights may for the purposes of these Rules be portable in crew spaces and in passenger spaces not appropriated for the use of unberthed passengers.

(6) Side scuttles shall not be fitted below the margin line in any space in a ship to which this Part applies which is appropriated solely to the carriage of cargo or coal. If side scuttles are fitted in spaces below the margin line which may be appropriated to the carriage either of cargo or of passengers such side scuttles and their deadlights shall be so constructed as to be incapable of being opened except by a person authorised to do so by the master of the ship.

(7) Automatic ventilating side scuttles shall not be fitted below the margin line in the shell plating of any such ship.

(8) (a) In every ship to which this Part applies each inlet and discharge led through the shell plating below the margin line shall be fitted with efficient and readily accessible means for preventing the accidental admission of water into the ship.

(b) Without prejudice to the generality of the foregoing, each through the shell plating from spaces below the margin line, not in connection with machinery, shall be provided with either—

(i) one automatic non-return valve fitted with a positive means by which it can be closed from a readily accessible position above the ship's bulkhead deck and with an indicator at the position from which the valve may be closed to show whether the valve is open or closed;

(ii) two automatic non-return valves, the upper of which is so situated above the ship's deepest subdivision load water line as to be always accessible for examination under service conditions and is of a horizontal balanced type which is normally closed.

(c) Any valve fitted in compliance with the requirements of subparagraph (b) which is a geared valve, or the lower of two non/geared valves, shall be secured to the ship's shell plating.

(d) All cocks and valves attached to inlets or discharges, other than inlets or discharges connected with machinery, being cocks or valves fitted below the margin line or the failure of which may affect the sub-division of the ship, shall be made of steel, bronze or other equally efficient material.

(e) Main and auxiliary inlets and discharges connected with machinery shall be fitted with readily accessible cocks or valves between the pipes and the ship's shell plating or between the pipes and a fabricated box attached to the shell plating. Such cocks or valves of more than 3" bore attached to such inlets or discharges shall be made of steel, bronze or other equally efficient material. If made of steel such cocks and valves shall be protected against corrosion.

(f) Discharge pipes led through the shell plating below the margin line of any ship of Classes I to VI inclusive, shall not be fitted in a direct line between the outboard opening and the connection with the deck, water closet or other similar fitting, but shall be arranged with bends or elbows of substantial metal other than cast iron or lead.

(g) All discharge pipes led through the shell plating below the margin line in such a ship and the valves relating thereto shall be protected from damage.

(h) All bolts connecting cocks, valves, discharge pipes and other similar equipment to the shell plating of such a ship below the margin line shall have their heads outside the shell plating, and shall be either countersunk or cupheaded.

(i) Efficient means shall be provided for the drainage of all watertight decks below the margin line in such a ship and any drainage pipes shall be so fitted with valves or otherwise arranged as to avoid the danger of water passing from a damaged to an undamaged compartment.

(j) The inboard opening of every ash-shoot, rubbish-shoot and other similar shoot in such a ship shall be fitted with an efficient watertight cover, and, if such opening is below the margin line, it shall also be fitted with an automatic non-return valve in the shoot in a readily accessible position above the ship's deepest sub-division load water line. The valve shall be of horizontal balanced type, normally closed and provided with local means for securing it in a closed position. The requirements of this sub-rule shall not apply to ash ejectors and expellers the inboard openings of which are in the ship's stokehold and necessarily below the deepest sub-division load water line. Such ejectors and expellers shall be fitted with means which will prevent water entering the ship.

(k) Any gangway port, cargo port, or coaling port fitted below the margin line of such a ship shall be of adequate strength and its lowest point shall not be below the ship's deepest sub-division load water line.

**34. Side and other Openings above Margin Line.**—In every ship to which this Part applies side scuttles, gangway ports, cargo ports, coaling ports and other openings in the shell plating above the margin line and their means of closing shall be of efficient design and construction and of sufficient strength having regard to the spaces in which they are fitted and their positions relative to the deepest sub-division load water line, and to the intended service of the ship.

**35. Weather Deck.**—In every ship to which this Part applies the bulkhead deck or a deck above the bulkhead shall be weather-tight. All openings in a weathertight deck shall have coamings of adequate height and strength and shall be coaming of adequate height and strength and shall be provided with efficient and rapid means of closing so as to make them weathertight. Freeing ports or scuppers shall be provided for clearing such deck of water under all weather conditions.

**36. Sub-division Load Lines.**—(1) Every ship to which this Part applies shall be marked on its sides amidships with the sub-division load lines assigned to it by the Central Government. The marks shall consist of horizontal lines one inch in breadth and nine inches in length. The marks shall be painted in white or yellow on a dark ground or in black on a light ground, and shall also be cut in or centre-punched on iron or steel ships, and cut into the planking on wood ships.

(2) The sub-division load lines shall be identified with the letter C.

(a) if there is only one sub-division load line it shall be identified with the letter C; in the case of ships of Classes III to VI inclusive, if there is only one sub-division load line it shall be identified by D.

(b) if there is more than one sub-division load line the sub-division load lines shall be identified with the letter C and with consecutive numbers beginning from the deepest sub-division load line, which shall be marked C1. Provided that in ships of Class III to VI inclusive, the corresponding letters shall be D and D1. The identifying letters and numerals shall in every case be painted cut or centre-punched in the same manner as the lines to which they relate.

### PART III

#### BILGE PUMPING ARRANGEMENTS

**37. Application of Part III.**—This Part applies to every ship to which these Rules apply.

**38. General.**—Every ship to which these Rules apply shall be provided with an efficient pumping plant capable of pumping from and draining any watertight compartment in the ship under all conditions likely to arise in practice after a casualty, whether or not the ship remains up-right. Wing suctions shall be provided if necessary for that purpose. Efficient arrangements shall be provided whereby water in any watertight compartment may find its way to the suction pipes. Efficient means shall be provided for draining water from all insulated holds and insulated between decks in such a ship.

**39. Number and type of Bilge Pumps ships of Classes I to V.**—Every ship of Classes I to V inclusive shall be provided with pumps connected to the bilge main in accordance with the following table:—

Length Ship Criter on numeral	Less than 300 ft.		300 ft. or over	
	Less than 30	30 and over	Less than 30	30 and over
Number of hand pumps of the crank type (may be replaced by one independent power pump)	2	—	—	—
Number of main engine pumps (may be replaced by one independent power pump)	1	1	1	1
Number of independent power pump	1	3	2	3

(2) The aforesaid pumping plant shall be arranged as follows:—

- (a) in ships provided with two hand pumps of the crank type in compliance with the foregoing paragraph, one of such pumps shall be installed forward and the other aft;
- (b) in other ships of Classes I to V—
  - (i) one of the pumps shall be an efficient emergency pump of a submersible type having its source of power and the necessary controls situated above the ship's bulkhead deck; or
  - (ii) the power pumps in the ship and their sources of power shall be so disposed throughout the ship's length that under any condition of flooding which the ship is required to withstand at least one such pump in an undamaged watertight compartment will be available:—

**40. Number and type of Bilge pumps: Class VI.**—(1) Every ship of Class VI be provided with bilge pumps in accordance with the following table:—

Length of the ship in feet	Number of Pumps		
	Main Engine Pumps*	Independent power pumps†	Hand pumps†
Under 50	1	—	One of the lever types for each watertight compartment or one of the crank types.
50 and under 100	1	1	One of the lever types for each water tight compartment or one of the crank types.
100 and under 250	1	1	One of the crank types.
250 and under 300	1	1	Two of the crank types.
300 and over	1	2	..

\*The main engine pump may be replaced by one independent power pump.

†The hand pumps specified in this column may be replaced by one independent power pump.

(2) In every ship of less than 300 feet but not less than 250 feet in length provided with two hand pumps of the crank type in accordance with the foregoing paragraph, in every such ship of 300 feet in length or more and in every ship of under 300 feet in length where the hand pump or pumps are replaced by an independent power pump, paragraph (2) of Rule 39 shall apply to the pumping arrangements as it applies to the pumping arrangements in ships of Classes I to V.

**41. Requirements for Bilge Pumps and Bilge Suctions.**—(1) Power bilge pumps fitted in any ship to which these Rules apply, shall where practicable be placed in separate watertight compartments so arranged or situated as not to be readily flooded by the same damage, and if the ship's engines and boilers are in two or more watertight compartments the bilge pumps there available shall be distributed through such compartments as far as possible.

(2) Every bilge pump provided in such a ship in compliance with these Rules shall be self-priming unless efficient means of priming are provided. Every such pump, other than a hand pump of the lever type and a pump provided for peck compartments only, shall, whether operated by hand or by power, be so arranged as to be capable of drawing water from any hold or any part of the machinery space in the ship.

(3) Every independent power bilge pump in such a ship shall be capable of giving a speed of water through the ship's main bilge pipe of not less than 400 feet per minute. Every such pump shall have a direct suction from the space in which it is situated. Provided that not more than two direct suctions shall be required in any one space. Every such suction shall be of a diameter of not less than that of the ship's main bilge pipe. The direct suctions in the ship's machinery space shall be so arranged that water may be pumped from each side of the space through direct suctions to independent bilge pumps.

(4) There shall be provided in the stokehold of every ship, being a coal burning ship, a flexible suction hose of sufficient length to reach from a fitting of an independent power bilge pump in the ship to each side of the stokehold bilges. The hose shall be in addition to the other bilge suctions required by this Rule, and shall have an internal diameter of 4 inches, or  $\frac{1}{2}$  inch larger than that of the largest branch bilge suction required by Rule 43, whichever is the less.

(5) Any main engine circulating pumps in such a ship shall be fitted with direct suction connections provided with non-return valves, to the lowest drainage level in the ship's machinery space, or as near thereto as will satisfy the Central Government in the case of that ship. Such connections shall be of a diameter atleast two-thirds of that of the ship's main sea inlet and the open end thereof or the strainer, if any, attached thereto shall be accessible for clearing. If the boiler fuel may be coal and there is no watertight bulkhead between the ship's engines and boilers, a direct discharge overboard shall be fitted from atleast one of the aforesaid pumps unless a by-pass is fitted to the circulating discharge thereof. The spindles of the ship's main sea inlet and of the direct suction valves shall extend well above the engine room platform.

(6) The hand bilge pumps in such a ship shall be workable from above the ship's bulkhead deck, if any, and shall be so arranged that the bucket and tail valve can be withdrawn for examination and overhaul under flooding conditions. If two hand pumps of the crank type are fitted in such a ship, a shut-off valve or cock operated from above the ship's bulkhead deck or non-return valves shall be provided to enable either of such pumps to be opened up without affecting the efficiency of the other.

**42. Arrangement of Bilge Pipes.**—(1) In every ship to which these Rules apply all pipes from the pumps for draining cargo spaces or any part of the machinery space shall be distinct from pipes which may be used for filling or emptying spaces in which water or oil is carried.

(2) Lead pipes shall not be fitted in connection with bilge pumps in such a ship in or under coal bunkers, oil fuel storage tanks or in any compartment in which oil settling tanks or oil fuel pumping units are situated.

(3) Bilge suction pipes in such a ship shall not be led through oil tanks unless the pipes are enclosed in an oiltight trunkway. Such pipes shall not be led through double bottom tanks.

(4) Such pipes shall be made with flanged joints and shall be thoroughly secured in position and protected where necessary against the risk of damage. Efficient expansion joints or bends shall be provided in each line of pipe, and where a connection is made at a bulkhead or elsewhere with a lead bend the radius of each bend and the distance between the axes of the straight parts of the pipes shall be not less than three times the diameter of the pipe and the length of any bend shall be not less than eight times that diameter.

**43. Diameter of Bilge Suction Pipes.**—(1) Subject to the provisions of paragraph (2) of this Rule in every ship of Classes I to VI, inclusive, the internal

diameter of main and branch bilge suction pipes shall be determined to the nearest  $\frac{1}{4}$  inch calculated according to the following formulae:—

$$d_m = \sqrt{\frac{L(B+D)}{2,500}} + 1$$

$$d_b = \sqrt{\frac{I(B+D)}{2,500}} + 1$$

where  $d$ —Internal diameter main bilge suction pipes in inches.

$d$ —Internal diameter of the branch bilge suction pipes in inches.

$L$ —length of ship in feet.

$B$ —Breadth of ship in feet.

$D$ —Moulded depth of ship at bulkhead deck in feet.

$I$ —Length of compartment in feet.

(2) No main bilge suction pipe in any ship of Classes I to VI, inclusive shall be less than  $2\frac{1}{2}$ " in bore, and no branch suction pipe shall be less than 2 inches, or need be more than 4", in bore.

**44. Precautions against flooding through bilge pipes.**—(1) The bilge and ballast pumping systems in every ship to which Part II applies shall be so arranged as to prevent water passing from the sea or from water ballast spaces into the ship's cargo spaces or into any part of the machinery space or from one watertight compartment in the ship to another. The bilge connection to any pump which effects suction from the sea or from water ballast spaces shall be made by means of either a non-return valve or a cock which cannot be opened at the same time to the bilges and to the sea or to the bilges and the water ballast spaces. Valves in bilge distribution boxes shall be of a non-return type. An arrangement of lock-up valves or of blank flanges shall be provided to prevent any deep tank in such a ship being inadvertently run up from the sea when it contains cargo or pumped out through a bilge pipe when it contains water ballast, and instructions for the working of such arrangement shall be conspicuously displayed nearby.

(2) Provision shall be made in every such ship to prevent the flooding of any watertight compartment served by a bilge suction pipe in the event of the pipe being severed or otherwise damaged, by collision or grounding, in any other watertight compartment. Where any part of such a pipe is situated nearer to the side of the ship than one-fifth of the mid-ship breadth of the ship measured at the level of the deepest subdivision load water line, or in any duct keel a non-return valve shall be fitted to the pipe in the watertight compartment containing the open end of the pipe.

**45. Bilge valves, cocks, etc.**—(1) In every ship to which Part II applies all distribution boxes, valves and cocks fitted in connection with the bilge pumping arrangements shall be in positions which are accessible at all times in ordinary circumstances and shall be so arranged that in the event of flooding one of the bilge pumps may operate on any watertight compartment in the ship. If in any such ship there is only one system of pipes common to all such pumps, the necessary valves or cocks for controlling the bilge suctions shall be capable of being operated from above the ship's bulkhead deck. If an emergency bilge pumping system is provided in addition to the main bilge pumping system it shall be independent of the main system and shall be so arranged that the pump is capable of being operated under flooding conditions on any watertight compartment. Provided that in any ship of Class VI of under 100 feet in length provided with a hand pump of the lever type for each watertight compartment in accordance with the provisions of paragraph (1) of Rule 40, the valves and cocks on the bilge main for controlling the bilge suctions need not be workable from above the ship's bulkhead deck if they are in the same compartment as a power pump.

(2) Every operating rod for bilge suction valves or cocks in every such ship shall be led as directly as possible and shall have an index plate at the position above the bulkhead deck from which it is operated showing the purpose served by the valve or cock and how it may be opened and closed. Every such rod passing through cargo or bunker spaces shall be protected against damage.

**46. Bilge mud boxes and strum boxes.**—Bilge suctions in the machinery space of every ship to which these Rules apply shall be led from readily accessible mud boxes placed wherever practicable above the level of the working floor of such space. The boxes shall have straight tail-pipes to the bilges and covers secured in such a manner as will permit them to be readily opened and closed. The suction ends

in hold spaces and tunnel wells shall be enclosed in strum boxes having perforations approximately 3/8 inch in diameter, and the combined area of such perforations shall not be less than twice that of the end of the suction pipe. Strum boxes shall be so constructed that they can be cleared without breaking any joint of the suction pipe.

**47. Sounding pipes.**—In every ship to which Part II applies all tanks forming part of the structure of the ship and all watertight compartments, not being part of the machinery space, shall be provided with efficient sounding arrangements which shall be protected where necessary against damage. Where such arrangements consist of sounding pipes, a thick steel doubling plate shall be securely fixed below each sounding pipe for the sounding rod to strike upon. All such sounding pipes shall extend to positions above the ship's bulkhead deck which shall at all times be readily accessible. Sounding pipes for bilges, coffer dams and double bottom tanks, being bilges, coffer dams and tanks situated in the machinery space, shall so extend unless the upper ends of the pipes are accessible in ordinary circumstances and are furnished with cocks having parallel plugs with permanently secured handles so loaded that on being released they automatically close the cocks. Sounding pipes for the bilges of insulated holds shall be insulated and not less than 2½ inches in diameter.

#### PART IV

##### ELECTRICAL EQUIPMENT AND INSTALLATIONS

**48. Application of Part IV.**—This Part applies to every ship to which these Rules apply.

**49. General.**—(1) In every ship to which these Rules apply the electrical equipment and installations, other than the electrical means of propulsion, if any, shall be such that the electrically operated services essential for the safety of the ship and of persons on board can be maintained under emergency conditions.

(2) Without prejudice to the preceding provisions of this Rule, the electrical equipment and installations (including any electrical means of propulsion) in every such ship shall be such that the ship and all persons on board are protected against electrical hazards and shall conform with the relevant provisions of the Regulations for the Electrical Equipment of Ships issued by the Institution of Electrical Engineers and dated September, 1939, as amended by a supplement dated November, 1947, except in so far as such Regulations as so amended are inconsistent with these Rules.

**50. Main generating sets: Ships of classes I to VI inclusive.**—Every ship of Classes I to VI, inclusive, being a ship in which electrical power is the only power for maintaining the auxiliary services essential for the propulsion or safety of the ship, shall be provided with not less than two main generating sets the power of which shall be sufficient to operate the aforesaid services in the event of any one of the sets being out of service. Arrangements shall be made which will safeguard such sets from being rendered inoperative in the event of the partial flooding of the ship's machinery space through leakage from a damaged compartment or otherwise.

##### EMERGENCY SOURCE OF ELECTRICAL POWER

**51. Ships of classes I to V.**—(1) In every ship of Classes I to V inclusive there shall be provided in a position above the bulkhead deck outside the machinery casings a self-contained emergency source of electrical power capable of operating simultaneously for a period of 36 hours, or for such shorter period as the Central Government may permit in the case of any ship regularly engaged on voyages of short duration,

- (a) the ship's emergency bilge pump, if it is electrically operated;
- (b) the ship's watertight doors, if they are electrically operated;
- (c) the ship's emergency lights at every boat station on deck and overside, in all alleyways, stairways and exits, in the machinery space, in the control station where radio, main navigating and central fire recording equipments are situated, and in the place where the emergency generator, if any, is situated;
- (d) the ship's navigation lights, if operated solely by electric power; and
- (e) all communication equipment and signals which may be required in an emergency, if they are electrically operated from the ship's main generating sets.

(2) The emergency source of electrical power may be either an accumulator battery capable of complying with paragraph (1) of this Rule without being recharged or suffering an excessive voltage drop, or a generator driven by a compression ignition engine with an independent fuel supply and with efficient starting arrangements. The fuel provided for such engine shall have a flash point of not less than 110°F.

(3) The emergency source of electrical power shall be so arranged that it will operate efficiently when the ship is listed 22½° and when the trim of the ship is 10° from an even keel.

(4) (a) If the emergency source of electrical power is an accumulator battery, the arrangements shall be such that the ship's emergency lighting system will come into operation automatically in the event of the failure of the main source of power for the ship's main lighting system.

(b) If the emergency source of electrical power is a generator, an accumulator battery shall be provided as a temporary source of electrical power so arranged as to come into operation automatically in the event of a failure of the main or emergency source of electrical power, and of sufficient capacity—

- (i) to operate the ship's emergency lighting system continuously for half an hour, and
- (ii) while such lighting system is in operation to close the ship's watertight doors if they are electrically operated, but not necessarily to close all of such doors simultaneously.

(c) Means shall be provided by which the automatic arrangements referred to in this paragraph can be tested.

#### EMERGENCY SOURCE OF ELECTRICAL POWER

**52. Ships of Class VI.**—(1) In any ship of Class VI which is provided with an emergency bilge pump in compliance with paragraph (2) of Rule 40 of these Rules, being an electrically operated pump, there shall be provided in a position above the bulkhead deck outside the machinery casings a self-contained emergency source of electrical power capable of operating the pump for a period of 24 hours.

(2) The emergency source of electrical power may be either an accumulator battery capable of complying with paragraph (1) of this Rule without being re-charged or suffering an excessive voltage drop, or a generator driven by a compression ignition engine with an independent fuel supply and with efficient starting arrangements. The fuel provided for such engine shall have a flash point of not less than 110°F.

(3) The emergency source of electrical power shall be so arranged that it will operate efficiently when the ship is listed 22½° and when the trim of the ship is 10° from an even keel.

**53. Distribution Systems.**—(1) In every ship to which these Rules apply every open-type switchboard shall be arranged so as to allow ready access to the back and front thereof without danger to any person who in the course of his duties may inspect or repair the switchboard or its connections or operate the devices thereon. The sides and backs of the switchboard shall be guarded by a hand rail, wire netting, expanded metal or other equally efficient means of protection and a non-conducting mat or grating shall be provided as a floor covering. No exposed parts which may have a voltage to earth exceeding 250 volts direct current or 150 volts alternating current shall be installed on the face of any switchboard or control panel.

(2) Hull return shall not be used in any such ship for the power, heat and light distribution systems thereof.

(3) If, in any such ship, two or more generating sets may be in operation at the same time for maintaining the auxiliary services essential for the propulsion or safety of the ship, a provision shall be made for the sets to operate in parallel and means shall be provided so that in the event of overload or a partial failure of the power supply the services not essential to the propulsion and safety of the ship will be cut out first, the services essential for these purposes being retained in circuit with such of the generators as may remain in service.

(4) In every such ship any electrically operated steering gear shall be served by two sets of feeder cables from the ship's main switchboard. Such sets of feeder cables shall be separated from each other throughout their length as widely as practicable. Each feeder cable shall have a capacity adequate for serving all motors which may operate simultaneously in connection with steering

gear. Such cables and motors shall be protected by fuses, circuit breakers or other similar devices against short circuits, but shall not be so protected against lesser loads.

(5) If in any such ship the power supply for an automatic sprinkler system, requiring not less than two sources of power supply for sea-water pumps, air compressors and automatic alarms, is electrical, such power supply shall be taken through the emergency switchboard by a feeder reserved solely for that purpose. There shall be no switch in the circuit other than that at the switchboard. The switch shall be clearly and permanently labelled to indicate its purposes and to indicate that it shall normally be kept closed.

(6) In every such ship the main and emergency feeder cables shall be separated vertically and horizontally as practicable.

**54. General Electrical Precautions.**—(1) In every ship to which these Rules apply all exposed metal parts of electrical equipment which are not intended to have a voltage above that of earth but which may have such a voltage under fault conditions shall be earthed, and all such equipment shall be so constructed and installed that there will be no danger of injury to a person handling it in a proper manner. The metal frames of all portable lamps and tools and other portable apparatus provided in such a ship and operating on an electric supply of a voltage of 100 volts or more shall be earthed through a conductor in the supply cable.

(2) Every electrical cable in such a ship shall, at every position at which an electrical fault may cause a fire, be covered by metal sheaths, metal armour or other equally effective means of protection. All metal sheaths and metal armour of electrical cable in such a ship shall be electrically continuous and shall be earthed.

(3) Wiring in every such ship shall be supported in such a manner as to avoid chafing and other injury.

(4) In every such ship the joints in all electrical conductors shall be made only in junction of outlet boxes except in the case of low voltage communication circuits. All such junctions or outlets boxes shall be so constructed as to prevent the spread of fire therefrom.

(5) All lighting fittings in every such ship shall be so arranged as to prevent rises in temperature which would be injurious to the electrical wiring thereof or which would result in a risk of fire in the surrounding material.

(6) Every electric space-heater forming part of the equipment of such a ship shall be fixed in position and shall be so constructed as to reduce the risk of fire to a minimum. No such heater shall be constructed with an element so exposed that clothing, curtains or other similar material can be scorched or set on fire by heat from the element.

(7) In every such ship each separate electrical circuit, other than a circuit which operates the ship's steering gear, shall be protected against overload. There shall be clearly and permanently indicated on or near each overload protective device the current carrying capacity of the circuit which it protects and the rating or setting of the device.

(8) In every such ship all accumulator batteries shall be housed in boxes or compartments which are so constructed as to protect the batteries from damage and are so ventilated as to minimise the accumulation of explosive gas. Electrical devices which are likely to arc shall not be installed in any compartment used to house accumulator batteries unless such devices are flameproof.

**55. Spare Parts and Tools.**—Every ship of Classes I to VI inclusive, shall be provided with an adequate quantity of replacements for those parts of the ship's electrical equipment and installations which, having regard to the intended service of the ship, it would be essential for the safety of the ship and of persons on board to replace in the event of failure while the ship is at sea, together with such tools as are necessary for the fitting of those replacements.

## PART V

### FIRE PROTECTION: SHIPS OF CLASSES I TO V INCLUSIVE

**56. Application of Part V.**—This Part applies to ships of Classes I to V inclusive.

**57. Exemption from Part V.**—(1) The Central Government may exempt from any of the requirements of Rules 62 to 69 inclusive and 71 to 75 inclusive of these Rules any ship carrying not more than 36 passengers if it is satisfied that the ship is fitted with an efficient fire detection system capable of giving a visible

and audible alarm signal at one or more points in the ship so as to come rapidly to the notice of the master and crew of the ship, which will indicate the presence and position of any fire in any accommodation space or service space, other than a space which in the opinion of the Central Government affords no substantial fire risk.

(2) The Central Government may further exempt any ship of Classes II, IV and V from the requirements of this Part to the extent that it is satisfied that compliance therewith is unreasonable or impracticable by person of the intended service of the ship.

**58. Exhibition of Plans.**—In every ship to which this Part applies there shall be provided for the guidance of the Master of the ship plans showing for each deck the sections of the ship enclosed by "A" Class divisions and the sections of the ship enclosed by "B" Class divisions, together with particulars of the fire alarm and fire detecting systems, sprinkler installations and fire extinguishing appliances provided in the ship, the means of entry into and exit from the various compartments and decks in the ship, and of the ship's ventilating system, including in particular the positions of the dampers thereof and the identification numbers of the ventilation fans serving each section of the ship. Such plans shall be protected by glass or similar material and shall be permanently affixed to a bulkhead, table or desk near the place from which the ship is normally navigated.

**59. "A" and "B" Class Division.**—(1) Every "A" Class division required by these Rules shall be constructed of steel or similar material, in either case stiffened so as to be capable of preventing the passage of smoke and flame throughout a standard fire test of 60 minutes duration. The division shall have an adequate insulating value having regard to the nature of the spaces adjacent thereto, and if the division is between spaces either of which contains adjacent combustible material it shall be so insulated that if either face of the division is exposed to standard fire test of 60 minutes duration the average temperature on the unexposed face of the division will not increase at any time during the test by more than 250°F (139°C) above the initial temperature on that face nor shall the temperature at any one point thereon increase by more than 325°F (180°C) above the initial temperature.

(2) Every "B" Class division required by these Rules shall be capable of preventing the passage of smoke and flame throughout a standard fire test of 30 minutes duration. Every such division shall have an adequate insulating value having regard to the nature of the spaces adjacent thereto. The division shall be so constructed that if either face thereof is exposed to a standard fire test of 30 minutes duration the average temperature on the unexposed face of the division will not increase by more than 250°F (139°C) above the initial temperature on that face, nor shall the temperature at any one point thereon increase by more than 325°F (180°C) above the initial temperature. Provided that any division which is constructed wholly of incombustible material shall be required to comply with the foregoing requirement relating to increase of temperature only during the first 15 minutes of a standard fire test.

(3) The Central Government may exempt any ship from the requirements of this Rule relating to insulation to the extent that it is satisfied that compliance therewith is unnecessary having regard to the degree of fire hazard present.

**60. Structure of the ship.**—(1) The hull, superstructure, structural bulkheads, decks and deckhouses of every ship to which this Part applies shall be constructed of steel. The Central Government may exempt any ship wholly or in part from the requirements of this paragraph if it is satisfied that the aforesaid parts of the ship are constructed of material equally resistant to fire.

(2) The hull, superstructure, and deckhouses of every ship to which this Part applies shall be subdivided by bulkheads consisting of "A" class divisions into main vertical zones. The mean length of each zone, above the bulkhead deck, shall not exceed 133 feet. Any steps in such bulkheads shall consist of "A" class divisions.

(3) Any portions of such divisions which extend above the ship's bulkhead deck shall, whenever possible, be in line with watertight subdivision bulkheads situated immediately below the bulkhead deck and shall extend from deck to deck and to the ship's shell plating and, in the case of a deckhouse, to the external plating thereof.

(4) The Central Government may exempt any ship from the requirements of paragraphs (2) and (3) of this Rule to the extent that it is satisfied that compliance therewith is incompatible with the purpose for which the ship is designed

and that other equally effective methods of fire protection have been adopted in the ship.

**61. Openings in "A" class divisions.**—(1) If, in any ship to which this Part of these Rules applies, any "A" class division is pierced for the passage of electric cables, pipes, trunkways, girders or beams, or for other purposes, the arrangements shall be such that the effectiveness of the division in resisting fire is not thereby impaired.

(2) Dampers shall be fitted in any trunkways which pass through an "A" class division and shall be provided with a suitable means of local control capable of being operated from both sides of the division. The positions from which such means of control may be operated shall be readily accessible and shall be permanently marked in red. Indicators shall be provided to show whether the dampers are open or shut.

(3) Any opening in such a division shall be provided with means of closure permanently attached to the division. The means of closure shall be as effective as the division in resisting fire.

(4) Any door in such a division shall be so constructed that it can be opened and closed by one person from either side of the division. The door and the means of keeping it closed shall be as effective as the division in resisting fire. Provided that a watertight door shall not be required to be insulated. If the division is constructed in compliance with paragraph (2) of Rule 60 of these Rules and any door therein is not a watertight door, such doors shall be self-closing and shall be provided with a device by which it may readily be released from the open position.

**62. Separation of accommodation spaces from other enclosed spaces.**—In every ship to which this Part applies the bulkheads and decks separating accommodation spaces from other enclosed spaces shall consist of "A" class divisions.

**63. Protection of stairways.**—(1) In every ship to which this Part applies every stairway within an accommodation space or service space shall be of steel frame construction and shall lie within an enclosure constructed of "A" class divisions. Provided that—

- (a) a stairway serving only two decks shall not be required to be enclosed by "A" class divisions at more than one deck;
- (b) a stairway in a public room shall not be required to be so enclosed if it lies wholly within the room.

The Central Government may exempt any ship, being a ship in which Method II of fire protection, within the meaning of Rule 71 of these Rules, has been adopted, from the requirements of this paragraph in relation to any stairway which it is satisfied is an auxiliary stairway adequately protected by sprinklers.

(2) Every opening in a bulkhead forming part of a stairway enclosure shall be provided with a means of closure which shall be permanently attached thereto. The means of closure shall be as effective as the bulkhead in resisting fire, and shall be self-closing unless it is a watertight door.

(3) Every stairway enclosure in such a ship shall communicate directly with the corridors, adjacent thereto and shall have an area sufficient to prevent congestion, having regard to the number of persons likely to use the stairway in an emergency. Every such enclosure shall contain as little accommodation space or service space as is practicable in the circumstances.

**64. Protection of lifts and vertical trunks for light and air.**—(1) In every ship to which this Part of these Rules applies every lift trunk, and every light-and-air and similar trunk in an accommodation space or service space, shall be constructed of "A" class divisions. Provided that a lift trunk within a stairway enclosure shall not be required to be insulated. Every door in such a trunk shall be constructed of steel or other incombustible material and shall be as effective as the trunk in resisting fire.

(2) Every lift trunk in such a ship shall be so fitted as to prevent the passage of smoke and flame from one between deck to another, and shall be provided with means of closure which will enable draught and smoke to be controlled.

(3) If in such a ship a light-and-air or similar trunk communicates with more than one between-deck space and smoke and flame may be conducted from one between-decks to another, smoke shutters shall be fitted so as to enable each such space to be isolated in the event of fire.

(4) Every other trunk in such a ship shall be so constructed as not to afford a passage for fire from one between decks or compartment to another.

**65. Protection of control stations.**—(1) Every control station in a ship to which this Part applies shall be separated from the rest of the ship by bulkheads and decks consisting of "A" class divisions.

(2) The radiotelegraph room in such a ship shall not be situated directly above any stairway.

**66. Protection of store rooms etc.**—(1) In every ship to which this Part applies the boundary bulkheads separating a galley, baggage room, mail room, store room, paint room, lamp room, or any similar space from any other space shall consist of "A" class divisions.

(2) Spaces appropriated for the storage of highly inflammable stores shall be so constructed and situated as to minimise the danger to persons on board in the event of fire.

**67. Deck sheathing.**—In every ship to which this Part of these Rules applies any permanent deck sheathing within an accommodation space, service space, control stations, stairway or corridor shall be such as will not readily ignite.

**68. Ventilation systems.**—(1) The inlets of every air supply system and the outlets of every air exhaust system in every ship to which this Part applies shall have readily accessible means by which they can be closed in the event of fire. Wherever practicable the system of ducts leading from each ventilating fan shall be within one main vertical zone.

(2) Every such ship shall be equipped with two master controls, situated as far apart as is practicable, either of which shall be capable of stopping all the fans in the power ventilation systems of the ship, other than the ventilation systems in the machinery space. Every power ventilation system serving the machinery space shall have two master controls one of which shall be capable of being operated from outside such space. Any exhaust duct from galley ranges in such a ship shall be constructed of "A" class divisions which shall be insulated where the ducts pass through accommodation spaces or service spaces.

**69. Miscellaneous items of fire protection.**—(1) Every air space enclosed behind a ceiling, panel or lining in the accommodation spaces or service spaces of a ship to which this Part applies shall be divided by close fitting drought-stops spaced not more than 45 feet apart in the fore and aft direction, and shall be closed at each deck.

(2) Every such ceiling, panel and lining shall be so constructed as to enable a fire patrol to detect any smoke originating in concealed or inaccessible space, without impairing the efficiency of the fire protection of the ship.

(3) In every such ship the concealed surfaces of every bulkhead, lining, panelling, stairway, wood grounds and other structure in accommodation spaces and service spaces shall be such that they will be surfaces of low flame spread within the meaning of Amendment No. 2, dated July, 1945, to the British Standard Definitions for Fire-Resistance, Incombustibility and Non-Inflammability of Building Materials and Structures (B.S. 476: 1932).

(4) In such a ship, paints, varnishes or similar preparations shall not be applied if they contain a nitro-cellulose base, and fabrics containing nitro-cellulose shall not be fitted.

(5) In such a ship overboard scuppers, sanitary discharges or other outlets shall not be made of lead if they are close to the water line or in such a position that the fusing of the lead in the event of fire would give rise to a danger of flooding.

(6) In such a ship the use of wood for the construction and equipment of galleys, bakeries and main pantries shall be restricted so far as is practicable.

(7) Every window and side scuttle in the accommodation spaces and service spaces of such a ship shall be constructed with metal frames. The glass therein shall be retained by a metal ring or bead. If the window or side scuttle is in a position in which the fusion of the frame, ring or bead, may give rise to a danger of flooding, the frame, ring or bead, as the case may be, shall consist of metal which is not likely to fuse in the event of fire. Every window and side scuttle in such a ship opening on to a corridor or stairways shall be as effective in resisting fire as the bulkhead in which it is fitted.

**70. Provision for cinematograph exhibitions.**—If any inflammable film is carried in a ship to which this Part applies for exhibition therein the ship and the cinematograph equipment provided therein shall comply with the requirements specified in the Fourth Schedule to these Rules.

**71. Methods of fire protection.**—The accommodation spaces and service spaces in every ship to which this Part applies shall be constructed in accordance with one of the following methods of fire protection and shall comply with such of the following requirements of this Part as are expressed to apply to ships in which that method has been adopted:—

**Method I.**—The construction in the accommodation spaces and service spaces of a system of internal bulkheading consisting of "B" class divisions, together with an automatic fire alarm and fire detection system in these spaces.

**Method II.**—The fitting of an automatic sprinkler, fire detection and fire alarm system in the accommodation spaces and service spaces.

**Method III.**—The subdivision of the accommodation spaces and services spaces by "A" class and "B" class divisions, together with the fitting of an automatic fire alarm and fire detection system in all accommodation spaces and service spaces and restriction of the provision of combustible material in these spaces.

**72. Bulkheads within main vertical zones (Methods I and III).** (1) **Method I.**—(a) Every bulkhead within the accommodation spaces or service spaces of a ship in which Method I of Fire protection has been adopted not being a bulkhead required by these Rules to consist of "A" class divisions, shall consist of "B" class divisions. The bulkheads shall be joined together in a manner which will ensure the maximum resistance to fire. If such a ship carries more than 100 passengers, the said "B" class divisions shall be constructed of incombustible material but, subject to the provisions of paragraph (1) (b) of Rule 75 of these Rules, may be faced with combustible material.

(b) Every such bulkhead shall extend from deck to deck. Provided that a bulkhead, other than a corridor bulkhead, may terminate at a ceiling consisting of incombustible material.

(c) Where the ship's shell plating forms the boundary of the accommodation space or a service space, the adjacent transverse bulkheads shall extend to the shell plating. Where the external plating of a deckhouse forms the boundary of an accommodation space or service space, the adjacent transverse and longitudinal bulkheads shall extend to the external plating. Provided that any such bulkhead, other than a corridor bulkheads, may terminate at a lining consisting of incombustible material.

(d) Any ventilation opening in a corridor bulkhead shall be in a lower part of the bulkhead wherever practicable and shall be provided with a grille constructed of incombustible material.

(2) **Method III.**—(a) Bulkheads within the accommodation spaces and services spaces of every ship in which Method III of fire protection has been adopted, not being a bulkhead required by these Rules to consist of "A" class divisions, shall be constructed of "B" class divisions so as form a continuous network of "B" class divisions, or together with such bulkheads as are constructed of "A" class divisions, a continuous network of "A" and "B" class divisions, the area of any one compartment formed by such network shall not exceed 1,600 sq. ft. and shall wherever practicable not exceed 1,300 square feet.

(b) Every public room in such a ship, being a space without interior subdivisions, shall except at the shell plating of the ship or the external plating of a deckhouse, be bounded by bulkheads consisting of "B" class divisions unless the bulkheads in closing the room are required by these Rules to consist of "A" class division.

(c) Every corridor bulkhead in such a ship shall consist of "B" class divisions unless it is required by these Rules to consist of "A" class divisions, and shall extend from deck to deck. Provided that ventilation openings having grilles of incombustible material may be installed in such bulkhead at points where no ceilings are fitted above such bulkhead or where the ceilings there fitted are constructed of incombustible material.

(d) If such a ship carries more than 100 passengers every "B" class division constructed in accordance with this paragraph shall be constructed of incombustible material but subject to the provisions of paragraph (2) of Rule 75 of these Rules, may be faced with combustible material. If such a ship carries 100 passengers or less, every such division shall have an incombustible core or shall be assembled with internal layers of sheet asbestos or similar incombustible material and in either case shall comply with the requirements of paragraph (2) of Rule 59 as if it were constructed wholly of combustible material.

**73. Automatic fire alarm and fire detection systems (Methods I and III).**—(1) In every ship in which Method I or Method III of fire protection has been adopted a fire alarm and fire detection system shall be installed which will detect the presence of fire in any accommodation space or service space and will indicate the presence and position of the fire by a signal given at one or more points in the ship so as to come rapidly to the notice of the master and crew of the ship.

(2) The Central Government may exempt any ship from the requirements of this Rule to the extent that it is satisfied that the accommodation spaces and service spaces therein afford no substantial fire risk.

**74. Automatic Sprinkler Fire Alarm and Fire Detection Systems (Method II).**—

(1) In every ship in which Method II of fire protection has been adopted an automatic sprinkler and fire alarm and fire detection system complying with the requirements specified in the Fifth Schedule to these Rules shall be installed and so arranged as to protect all accommodation spaces and service spaces in the ship.

(2) The Central Government may exempt any ship from the requirements of this Rule—

- (a) to the extent that it is satisfied that the accommodation spaces and service spaces therein afford no substantial fire risk;
- (b) in respect of any baggage room or store room which it is satisfied is provided with adequate arrangements for the detection of fire or for the smothering of fire by gas or steam.

**75. Restriction of Combustible Material, etc. (Methods I and III)** (1) *Method I:*

(a) In every ship in which Method I of fire protection has been adopted all linings, grounds, ceilings and insulation shall consist of incombustible material except in cargo spaces, mail rooms, bullion rooms, baggage room and refrigerated store rooms. Provided that the linings, grounds and ceilings in ship carrying not more than 100 passengers may be constructed of combustible material having the same fire-resisting properties as the material of the bulkheads enclosing the spaces in which they are situated.

(b) The total volume of combustible materials installed as facings, mouldings, decorations or veneers in any accommodation space or service space in a ship in which Method I of fire protection has been adopted, being a ship carrying more than 100 passengers, shall not exceed a volume equal to that of a veneer of one-tenth of an inch on the combined area of the walls and ceiling of such space. Any facings, mouldings, decorations, or veneers installed in the corridors or stairway enclosures in such a ship shall consist of incombustible materials.

(2) *Method III.* In every ship in which Method III of fire protection has been adopted the provision of combustible materials for linings, grounds, ceilings, fittings and furnishings in any space in the accommodation spaces or service spaces shall be restricted to the minimum compatible with the use for which that space is appropriated. In the public rooms in such a ship the grounds and supports for the linings and ceilings shall be constructed of steel or other material equally effective in resisting fire. All exposed surfaces and their coatings in the accommodation spaces of such a ship shall be surfaces of low flame spread within the meaning of paragraph (3) of Rule 69 of these Rules.

## PART V(A)

### FIRE PROTECTION: SHIPS OF CLASS VI

**76 Application of Part V(A).**—This Part applies to ships of Class VI.

**77. Structure of the ship.**—The hull, superstructure, structural bulkheads, decks and deckhouses of every ship of Class VI shall be constructed of steel. The Government of India may exempt any ship wholly or in part from the requirements of this Rule.

**78. Divisions.**—In every ship to which this Part applies, being a ship fitted with internal combustion propelling machinery or oil-fired boilers, the accommodation spaces shall be separated from machinery spaces by "A" class divisions.

## PART VI

### BOILERS AND MACHINERY

**79. Application of Part VI.**—This Part applies to every ship to which these Rules apply.

**80. General.**—The boilers and machinery provided in any ship to which these Rules apply shall be of a design and construction adequate for the service for which they are intended, and shall be so installed and protected as not to constitute a danger to persons on board. Without prejudice to the generality of the foregoing, means shall be provided which will prevent overpressure in any part of such boilers and machinery, and in particular every boiler and other pressure vessel used for generating steam shall be provided with not less than two safety valves.

**81. Power for going astern.**—The propelling machinery of every ship to which these Rules apply shall have sufficient power for going astern, and the propulsion of the ship shall be capable of being reversed with sufficient speed, to enable the ship to be properly handled.

**82. Boilers, Superheaters, Economisers, Evaporators, Distillers and other Steam or Water pressure vessels.**—(1) In every ship to which these Rules apply, every boiler, superheater, economiser, evaporator, distiller and other steam or water pressure vessel, and their respective mountings, shall be so designed and constructed as to withstand the maximum working stresses to which they may be subjected, with a factor of safety which is adequate, having regard to—

- (a) their design and the material of which they are constructed;
- (b) the purpose for which they are intended to be used; and
- (c) the working conditions under which they are intended to be used.

Provision shall be made which will facilitate the cleaning and inspection of such pressure vessels.

(2) Without prejudice to the generality of the foregoing—

- (a) every such boiler and superheater, when put into service for the first time in such a ship, shall be capable of withstanding for a period of not less than thirty minutes a test by hydraulic pressure to the following extent:—
  - (i) to one and one-half times the maximum working pressure of the boiler plus 50 lb. per square inch; if such working pressure is more than 100 lb. per square inch; or
  - (ii) to twice the maximum working pressure of the boiler, if such working pressure is 100 lb. per square inch or less;
- (b) every such boiler and superheater, being a boiler or superheater of such dimensions and form that an adequate internal examination thereof can be made, shall, at any time after first being put into service in such a ship, be capable of withstanding for a period of not less than thirty minutes a test by hydraulic pressure to one and one-half times the maximum working pressure of the boiler;
- (c) every such boiler and superheater, being a boiler or superheater of such dimensions and form that an adequate internal examination thereof cannot be made, shall, at any time after first being put into service in any such ship, be capable of withstanding a test by hydraulic pressure to the extent specified in sub-paragraph (a) of this paragraph.

(3) Every such economiser shall be capable at all times of withstanding a test by hydraulic pressure to the following extent:—

- (a) if the economiser cannot be shut off from the boiler, to the same extent as is required by sub-paragraph (a) of paragraph (2) of this Rule in relation to the boiler to which the economiser is connected; or

(b) if the economiser can be shut off from the boiler, to one and one-half times the maximum working pressure of the safety valve of the economiser plus 50 lb. per square inch.

(4) Each mounting of every such boiler, not being a mounting in the boiler feed system, shall be capable of withstanding a test by hydraulic pressure to twice the maximum working pressure of the boiler.

Each mounting of every such superheater and economiser, not being a mounting in the boiler feed system, shall be capable of withstanding a test by hydraulic pressure to twice the maximum working pressure of the boiler to which the superheater or economiser, as the case may be, is connected.

**83. Machinery.**—(1) In every ship to which these Rules apply a governor shall be provided for any ahead turbine or set of turbines which drives a single gear wheel forming part of the main propelling machinery, so as to shut off the steam automatically in the event of overspeed. A hand-trip gear shall also be provided for that purpose.

(2) In every such ship means shall be provided which will shut off automatically the steam from any ahead turbine, and any other machinery served by the same lubricating oil system as the turbine, in the event of any failure of that system.

(3) (a) The Nozzle boxes of every impulse steam turbine fitted in such a ship shall be capable of withstanding a test by hydraulic pressure to one and one-half times the maximum pressure to which they may be subjected in service.

(b) The steam casings of every turbine fitted in such a ship shall be capable of withstanding a test hydraulic pressure to one and one-half times the maximum working pressure in such casings or 30 lbs. per square inch, whichever shall be the greater.

(4) The cylinders of all steam reciprocating machinery fitted in such a ship shall be capable of withstanding a test by hydraulic pressure to the following extent:—

Type of engine	Cylinder Pressure	Pressure of test
Compound expansion	High	$\frac{1}{2} \times M.W.P.$
Compound expansion	Low	30 lbs. per square inch.
Triple expansion	High	$\frac{1}{2} \times M.W.P.$
Triple expansion	Intermediate	$\frac{1}{2} \times M.W.P.$
Triple expansion	Low	30 lbs. per square inch.
Quadruple expansion	High	$\frac{1}{2} \times M.W.P.$
Quadruple expansion	1st Intermediate	$\frac{3}{5} \times M.W.P.$
Quadruple expansion	2nd Intermediate	$\frac{2}{5} \times M.W.P.$
Quadruple expansion	Low	30 Lbs. per square inch.

In the foregoing table "M.W.P." means, in relation to a cylinder, the maximum working pressure of the boiler to which the machinery of which the cylinder forms a part is connected.

(5) The cylinder liners of every compression ignition engine fitted in such a ship, shall be capable of withstanding a test by hydraulic pressure to 100 lbs. per square inch. The cooling passages of the cylinders, covers and other fluid cooled parts of such engine shall be capable of withstanding a test by hydraulic pressure to 30 lbs. per square inch.

(6) Subject to the provisions of paragraph (2) of Rule 51 of these Rules and paragraph (2) of Rule 52 thereof, no machinery or boilers shall be fitted in such a ship which are designed to be operated by means of oil fuel having a flash point of less than 150° F.

**84. Shafts.**—In every ship to which these Rules apply every shaft shall be so designed and constructed that it will withstand the maximum working stresses to which it may be subjected, with a factor of safety which is adequate having regard to—

- (a) the material of which it is constructed;
- (b) the service for which it is intended; and
- (c) the type of the engines by which it is driven or of which it forms a part.

**85. Boiler feed Systems.**—(1) Every boiler fitted in a ship to which these Rules apply shall be provided with not less than two efficient and separate feed systems so arranged that either of such systems may be opened up for inspection or overhaul without affecting the efficiency of the other. Means shall be provided which will prevent overpressure in any part of the systems.

(2) If it is possible for oil to enter the feed water system in such a ship, the arrangements for supplying boiler feed water shall provide for the interception of oil in the feed water.

(3) Every feed check valve, fitting and pipe through which feed water passes from a pump to the boilers in such a ship shall be of efficient design and of sufficient strength to withstand with an adequate factor of safety the maximum working pressure to which the feed line may be subjected. Such valve, fitting and pipe shall also be capable of withstanding a test by hydraulic pressure to two and one-half times the maximum working pressure of the boiler to which they are connected or twice the maximum working pressure of the feed line, whichever shall be the greater. The feed pipes shall be adequately supported.

**86. Steam Pipe Systems.**—(1) In every ship to which these Rules apply, every steam pipe and every fitting connected thereto through which steam may pass shall be so designed and constructed as to withstand the maximum working stresses to which it may be subjected, with a factor of safety which is adequate having regard to—

- (a) the material of which it is constructed; and
- (b) the working conditions under which it will be used.

The steam pipes shall be adequately supported.

(2) Without prejudice to the generality of the foregoing, every such steam pipe and fitting shall be capable of withstanding a test by hydraulic pressure to twice the maximum working pressure to which it may be subjected.

(3) Provision shall be made which will avoid excessive stress likely to lead to the failure of any such steam pipe, whether by reason of variation in temperature, vibrations or otherwise.

(4) Efficient means shall be provided for draining every such steam pipe so as to ensure that the interior of the pipe is kept free of water and that hammer action will not occur under any conditions likely to arise in the course of the intended service of the ship.

(5) If, in any ship to which these Rules apply, a steam pipe may receive steam from any source at a higher pressure than it can withstand with an adequate factor of safety, an efficient reducing valve, relief valve and pressure gauge shall be fitted to such pipe.

**87. Air Pressure Systems.**—(1) Every ship to which these Rules apply, being a ship propelled by compression ignition engines designed to be started by compressed air, shall be provided with at least two starting air compressors, each of which shall be of efficient design and of sufficient strength and capacity for the service for which it is intended. Provided that in ships of Class VI, only one such compressor shall be required.

(2) Without prejudice to the generality of the foregoing—

- (a) every cylinder forming part of an air compressor in a ship to which these Rules apply shall be capable of withstanding a test by hydraulic pressure to twice its maximum working pressure;
- (b) every cooling coil of each stage forming part of such air compressor shall be capable of withstanding a test by hydraulic pressure to twice the maximum working pressure of that stage;
- (c) the cooling passages of such air compressor and the cooler casings thereof shall be capable of withstanding a test by hydraulic pressure to 30 lbs. per square inch; and
- (d) a relief valve shall be fitted in the high pressure discharge from such compressor, and a relief valve or safety diaphragm shall be fitted on the casings of the high pressure cooler.

(3) Every such ship shall be provided with a starting air compressor which can be put into operation without a supply of compressed air, and which shall be

additional to the compressors required by paragraph (1) of this Rule. Provided that such additional compressor shall not be required if a compressor fitted in accordance with the said paragraph can be put into operation without a supply of compressed air.

(4) Every ship to which these Rules apply, being a ship propelled by compression ignition engines designed to start by compressed air, shall be provided with at least two air receivers, which shall be of such aggregate capacity, that when they are filled with compressed air, the air contained therein will be sufficient to start each of the ship's main engines twelve times if such engines are reversible, and six times if such engines are non-reversible. Provided that in ships of Class VI, only one such air receiver shall be required.

(5) Every air receiver provided in such a ship shall be so designed and constructed as to withstand the maximum working stresses to which it may be subjected, with a factor of safety which is adequate having regard to—

(a) Its design and the material of which it is constructed; and

(b) the working conditions under which it is intended to be used.

Without prejudice to the generality of the foregoing, every air receiver shall be capable of withstanding a test by hydraulic pressure to the extent set forth in the following table:—

<i>Construction of Receiver</i>	<i>M.W.P. of Receiver</i>	<i>Pressure of Test</i>
Riveted	Not over 100	$2 \times M.W.P.$
Riveted	over 100 but not over 300	$\frac{1}{2} \times M.W.P. + 50$
Riveted	over 300	$M.W.P. + 200$
Fusion Welded	Not over 100	$2 \times M.W.P.$
Fusion Welded	Over 100	$\frac{1}{2} \times M.W.P. + 50$

In the foregoing table pressures are indicated in lb. per square inch and "M.W.P." means maximum working pressure.

(6) Every air bottle provided in a ship to which these Rules apply shall be of efficient design and shall be made of seamless steel tube with the ends of the bottle worked down from the tube or shall be of equally efficient construction. The bottle shall be annealed and shall be capable of withstanding a test by hydraulic pressure to twice its maximum working pressure.

(7) Every air receiver and air bottle provided in such a ship shall be fitted with means of access for purposes of inspection and shall be provided with efficient drains for the removal of oil and water, and with efficient relief valves to prevent over pressure. If the air receiver or air bottle can be isolated from the relief valve, it shall be fitted with one or more fusible plugs so as to discharge its contents in the event of fire.

(8) (a) Every air pressure pipe provided in such a ship and every fitting connected to such pipe, shall be capable of withstanding the maximum working stresses to which it may be subjected with a factor of safety which is adequate having regard to—

(i) the material of which it is constructed; and

(ii) the working conditions under which it is intended to be used.

(b) Without prejudice to the generality of foregoing, every such pipe and fitting shall be capable of withstanding a test by hydraulic pressure to twice its maximum working pressure.

(c) Every such pipe shall be properly supported. Provision shall be made which will keep the interior of the pipe free from oil and either will prevent the passage of flame from the cylinders of the engine to the pipe, or will protect the pipe from the effect of an internal explosion.

(9) If, in any ship to which these Rules apply an air pressure pipe may receive air from any source at a higher pressure than it can withstand with an adequate factor of safety, an efficient reducing valve, relief valve and pressure gauge shall be fitted to such pipe.

**88. Engine Cooling Systems.**—(1) In every ship to which these Rules apply, being a ship propelled by internal combustion machinery or provided with internal combustion engines for the maintenance of services essential for the safety of the ship or of persons on board, two pumps shall be provided each of which shall be capable of supplying adequate cooling water to such machinery or engines, as

the case may be, and to any oil coolers or fresh water coolers fitted thereto. Provided that in ships of Class VI, only one such pump shall be required.

(2) If direct sea water cooling is used for any such machinery or engines, the sea water suctions shall be provided with strainers which can be cleaned without interruption of the supply of water.

(3) Means shall be provided for ascertaining whether the cooling systems are working properly and for preventing overpressure in any part thereof.

(4) The exhaust pipes and silencers of every internal combustion engine provided in a ship to which these Rules apply shall be efficiently cooled or lagged.

**89. Lubricating oil systems.**—(1) In every ship to which these Rules apply, being a ship in which oil for the lubrication of the main engines is circulated under pressure, at least two pumps shall be provided each of which shall be adequate for circulating such oil. Provided that in ships of Class VI, only one such pump shall be required.

(2) Strainers shall be provided for straining the lubricating oil, and except in ships of Class VI, shall be capable of being cleaned without interrupting the supply of such oil.

(3) Means shall be provided for ascertaining whether the lubricating system is working properly, and for preventing overpressure in any part of the system. If the means of preventing overpressure is a relief valve it shall be in close circuit.

**90. Oil Fuel Installations (Boilers and Machinery).**—(1) In every ship to which these Rules apply, being a ship propelled by means of oil-fired boilers or internal combustion machinery, every double bottom compartment appropriated for the storage of oil fuel, not being a compartment situated at the extreme forward or after end of the ship, shall be fitted with a watertight centre division.

(2) Every oil fuel tank in such a ship shall be properly constructed and shall be provided with save-alls or gutters which will catch any oil which may leak from the tank. No such tank shall be situated directly above boilers or other heated surfaces. Without prejudice to the generality of the foregoing, every such tank shall be capable of withstanding a test by hydraulic pressure in the case of a storage tank, settling tank or service tank, equal to that of a head of water one foot greater than the greatest head to which the tank may be subject when in service, but in the case of a settling tank, to not less than 15 lbs. per square inch.

(3) The oil fuel carried in such a ship shall be effectively isolated from Water ballast which may be carried therein. The pumping arrangements shall be such as will permit the oil fuel to be transferred from any storage tank or settling tank appropriated for oil fuel into any other storage tank or settling tank so appropriated. Provision shall be made to prevent the accidental discharge or overflow of oil overboard. If fresh water is stored in a tank adjacent to a tank appropriated for the storage of oil fuel a cofferdam shall be provided which will prevent contamination of the fresh water by the oil.

(4) In every such ship efficient means shall be provided for sounding every oil fuel tank therein and to prevent overpressure in such tank.

(5) In every such ship, an air pipe shall be led from every oil fuel tank to the open air, and the outlet thereof shall be in such a position that there will be no danger of fire or explosion resulting from the emergence of oil vapour from the pipe when the tank is being filled. Every such pipe shall be fitted with a detachable wire gauze diaphragm. If such pipe also serves as an overflow pipe provision shall be made which will prevent the overflow from running into or near a boiler room, galley or other place in which it might be ignited.

(6) Every drain provided in such a ship for the purpose of removing water from oil fuel in storage or settling tanks or in separators shall be of the self-closing type.

(7) The oil fuel filling stations in every such ship shall be isolated from other spaces in the ship and shall be efficiently drained and ventilated. Provision shall be made which will prevent overpressure in any oil-filling pipe lines.

(8) In every such ship, every oil pressure pipe shall be made of seamless steel, and, if used for conveying heated oil, shall be situated in a conspicuous position above the platforms in well-lighted parts of the boiler room or engine room. Every such pipe and joint therein and every fitting connected to such

pipe, shall be capable of withstanding a test by hydraulic pressure to 400 lbs. per square inch or to twice its maximum working pressure, whichever shall be the greater.

(9) In every such ship, every oil pipe, not being an oil pressure pipe, shall be made of steel and shall be led at such a height above the ship's inner bottom, if any, as will facilitate the inspection and repair of the pipe. Every such pipe and joint therein, and every fitting connected to such pipe, shall be capable of withstanding a test by hydraulic pressure to 50 lbs. per square inch or to twice its maximum working pressure whichever shall be the greater.

(10) In every such ship every steam heating pipe which may be in contact with oil shall be made of steel, and together with its joints, shall be capable of withstanding a test by hydraulic pressure to twice its maximum working pressure.

(11) In every such ship every suction pipe from any oil fuel tank situated above an inner bottom, and every oil fuel levelling pipe within a boiler room or engine room shall be fitted with a valve or cock secured to each tank to which the pipe is connected. Every such valve or cock fitted to an oil fuel suction pipe shall be so arranged that it may be closed both from the compartment in which it is situated and from a readily accessible position outside such compartment and not likely to be cut off in the event of fire in that compartment. Every such valve or cock fitted to an oil fuel levelling pipe shall be so arranged that it can be closed or opened from a readily accessible position above the bulkhead deck and not likely to be cut off by a fire in the compartment in which the pipe is situated. If any oil tank filling pipe is not connected to an oil fuel tank at or near the top of the tank, it shall be fitted with a non-return valve or with a valve or cock secured to the tank to which it is connected and so arranged that it may be closed both from the compartment in which it is situated and from a readily accessible position outside such compartment and not likely to be cut off in the event of fire in that compartment.

(12) In every such ship every master valve at the furnace fronts which controls the supply of oil fuel to sets of burners shall be of a quick-closing type and fitted in a conspicuous position and readily accessible. Provision shall be made to prevent oil from being turned on to any burner unless such burner has been correctly coupled up to the oil supply line.

(13) In every such ship every valve used in connection with the oil fuel installation shall be so designed and constructed as to prevent the cover of the valve chest being slackened back or loosened when the valve is operated.

(14) In every such ship every pump provided for use in connection with the oil fuel system shall be separate from the ship's feed pumps, bilge pumps and ballast pumps and the connections of any of such pumps, and shall be provided with an efficient relief valve which shall be in close circuit. Provision shall be made by which every oil fuel pressure pump and transfer pump may be stopped from a position outside the compartment in which such pump is situated.

(15) Every such ship shall be provided with not less than two oil fuel units, each comprising a pressure pump, filters and a heater. Such pump, filters and heater shall be of efficient design and substantial construction. Provision shall be made which will prevent overpressure in any part of the oil fuel units. The parts of such oil fuel units which are subject to oil pressure, and the joints thereof, shall be capable of withstanding a test by hydraulic pressure to 400 lbs. per square inch or twice their maximum working pressure, whichever shall be the greater. Any relief valves fitted to prevent overpressure in the oil fuel heater shall be in close circuit. If steam is used for heating oil fuel in bunkers, tanks, heaters or separators in any such ship, exhaust drains shall be provided to discharge the water of condensation into an observation tank.

(16) In every such ship save-alls or gutters shall be provided under every oil fuel pump, filter and heater to catch any oil which may leak or be spilled therefrom. Save-alls or gutters shall be provided in way of the furnace mouths to catch oil which may escape from the burners. Provision shall be made which will prevent oil which may escape from any oil fuel pump, filter or heater from coming into contact with boilers or other heated surfaces.

(17) Every oil fuel separator in such a ship shall be of efficient design and substantial construction. Provision shall be made which will prevent over-pressure in any part thereof, and which will prevent the discharge of oil vapour therefrom into confined spaces.

(18) If, in any ship to which these Rules apply, being a ship propelled by means of oil-fired boilers, dampers are fitted to the funnel or boilers, provision shall be made for securing the dampers in the open position, and an indicator shall be provided to show whether the dampers are open or shut.

(19) For the purposes of this Rule the expression 'oil fuel tank' includes an oil storage tank, an oil fuel settling tank, an oil fuel service tank and an oil fuel overflow tank.

**91. Oil Fuel Installations (Cooking Ranges).**—(1) If, in any ship to which these Rules apply, a cooking range is supplied with fuel from an oil tank, the tank shall not be situated in a galley, and the supply of oil to the burners shall be capable of being controlled from a position outside the galley. No range or burners shall be fitted which are designed to be operated by means of oil fuel having a flash point of less than 150°F.

(2) The tank shall be provided with an air pipe leading to the open air. The pipe shall be in such a position that there will be no danger of fire or explosion resulting from the emergence of oil vapour from the pipe when the tank is being filled. The pipe shall be fitted with a detachable wire gauze diaphragm.

(3) Efficient means shall be provided for filling every such tank and for preventing overpressure therein.

**92. Ventilation.**—In every ship to which these Rules apply, every space in which an oil fuel tank or any part of an oil fuel installation is situated shall be adequately ventilated.

**93. Steering Gear.**—(1) Every ship to which these Rules apply shall be provided with efficient main and auxiliary steering gear; Provided that auxiliary steering gear shall not be required if the ship's main steering gear is fitted with duplicate power units and duplicate connections up to the rudder stock.

(2) The auxiliary steering gear shall be capable of being rapidly brought into action and shall be of adequate strength, and of sufficient power to enable the ship to be steered at a navigable speed. The auxiliary steering gear shall be operated by power in any such ship which is fitted with a rudder stock of over 9 inches in diameter in way of the tiller.

(3) In every ship to which these Rules apply means shall be provided by which the ship can be steered from a position aft.

**94. Stores, Spare Gear and Tools.**—Every ship of Classes I to VI inclusive, shall be provided with such stores, spare gear and tools as are sufficient, having regard to the intended service of the ship, to enable running repairs to the ship's boilers and machinery to be made while the ship is at sea.

## PART VII

### MISCELLANEOUS |

**95. Application of Part VII.**—This Part applies to every ship to which these Rules apply.

**96. Compasses.**—(1) (a) Every ship of Classes I and III shall be provided with three efficient magnetic compasses which shall be sited on the ship's centre line. One of such compasses shall be provided for use as a steering compass and shall be sited at the normal steering position, and another shall be provided for use as a standard compass and shall be sited near to the normal steering position and in a position from which the view of the horizon is least obstructed. A third such compass shall be provided at the after steering position, and shall, together with its gimbal units, be interchangeable with the steering compass:

Provided that a magnetic steering compass shall not be required if

- (i) the standard compass is of the reflector or projector type and is equipped with a device by which it may be read from the normal steering position;
- (ii) the standard compass is interchangeable with the after steering compass; and
- (iii) a card of a gyroscopic compass or of a repeater thereof can be read from the normal steering position.

(b) Every magnetic compass provided in such a ship shall be mounted on a binnacle: Provided that the after steering compass may be mounted on a pedestal.

(2) Every ship of Classes II, IV, V and VI, shall be provided with two efficient magnetic compasses sited on the ship's centre line, one of which shall be for use

as a steering compass and shall be sited at the normal steering position, and the other of which shall be for use as a standard compass, and shall be sited near to the normal steering position and in a position from which the view of the horizon is least obstructed. Each of such compasses shall be mounted on a binnacle.

**97. Depth Sounding Devices.**—(1) Every ship of Classes I to V inclusive, shall be provided with an efficient mechanical depth-sounding device operated by means of a line, and with such spare parts as are sufficient, having regard to the type of the device and to the intended service of the ship, to enable the device to be maintained in working order while the ship is at sea; Provided that a mechanical depth-sounding device shall not be required in any ship of Class II, IV or V which is under 1,600 tons.

(2) Every ship of Classes I to VI inclusive, shall be provided with two hand lead-lines, each at least 25 fathoms long, and each with a lead weighing at least 7 lbs.

**98. Anchors and Chain Cables.**—Every ship to which these Rules apply shall be provided with such anchors and chain cables as are sufficient in number, weight and strength, having regard to the size and intended service of the ship.

**99. Hawsers and Warps.**—Every ship to which these Rules apply shall be provided with such hawsers and warps as are sufficient in number and strength, having regard to the size and intended service of the ship.

**100. Means of Escape.**—(1) Every ship to which these Rules apply, shall be provided with such doorways, stairways, ladderways and other means of escape as will provide readily accessible means of escape for all persons in the ship. The means of escape shall be so designed and constructed as to be capable of being easily used by the persons for whom they are intended. The number and width of such means of escape shall be sufficient having regard to the number of persons by whom they may be used and shall not pass through any doorway which may be closed by a door required by these Rules to be watertight.

(2) In every ship of Classes I to V at least two such means of escape shall be provided in each portion of a between decks above the bulkhead deck falling within a main vertical zone, and one of the means of escape provided in each such portion shall give access to a stairway leading upwards from the between decks; Provided that in ships of Class I the means of escape from the lifeboat embarkation deck shall not be required to give access to a stairway leading upwards from that deck.

(3) In every ship of Classes I and III such means of escape shall lead to the lifeboat embarkation deck.

(4) In every ship of Classes II, IV and V such means of escape shall lead to the lifeboat embarkation deck and to an open deck of sufficient area, having regard to the number of persons whom the ship may carry.

(5) In every ship of Class VI such means of escape shall lead to an open deck of sufficient area, having regard to the number of persons whom the ship may carry.

**101. Guard Rails, Stanchions and Bulwarks.**—In every ship to which these Rules apply, bulwarks or guard rails shall be provided on every deck to which any persons may have access. Such bulwarks or guard rails, together with stanchions supporting the guard rails, shall be so placed, designed and constructed, and in particular shall be of such a height above the deck, as to prevent any person who may have access to that deck from accidentally falling therefrom. Any freeing ports fitted in such a bulwark shall be covered by a grid or bars which will prevent any person from falling through the port.

**102. Alternative Construction, Equipments and Machinery.**—Where these Rules require that the hull or machinery of a ship shall be constructed in a particular manner, or that particular equipment shall be provided, or particular provision shall be made, the Central Government may allow the hull or machinery of the ship to be constructed in any other manner, or any other equipment to be provided or other provision made, if it is satisfied that other construction or equipment, or other provision, is at least as effective as that required by these Rules.

## FIRST SCHEDULE

## Calculation of Maximum Length of Watertight Compartments

## PART I

1. *General.*—(1) For the purposes of this Schedule, except where otherwise specified,

- (a) all linear measurements shall be in feet; and
- (b) all volumes shall be in cubic feet and shall be calculated from measurements taken to moulded lines.

(2) In this Schedule the Symbol 'L' denotes the length of the ship.

(3) In this Schedule the expression "passenger spaces" shall include galleys, laundries and other similar spaces provided for the service of passengers, in addition to space provided for the use of passengers.

2. *Permissible Length.*—Subject to the provisions of paragraph 6 of this Schedule the length of a compartment shall not exceed its permissible length. The permissible length of a compartment having its centre at any point shall be the product of the floodable length at that point and the factor of subdivision of the ship.

## PART II

## Ships of Classes I and II

3. *Assumption of Permeability.*—The assumptions of permeability which shall be taken into account in determining the floodable length at any point in ships to which this Part of this Schedule applies shall be as follows:—

(a) Machinery space:—

(i) In the case of ships not propelled by internal combustion engines the assumed average permeability throughout the machinery space shall be determined by the following formula:—

$$\frac{80 + 12.5}{v} \quad (a-c) \text{ where}$$

*a*=volume of the passenger spaces and crew spaces below the margin line within the limits of the machinery space;

*c*=volume of the between deck spaces below the margin line within the limits of the machinery space which are appropriated to cargo, coal or stores; and

*v*=volume of the machinery spaces below the margin line.

(ii) In the case of ships propelled by internal combustion engines the average permeability throughout the machinery space shall be taken as 5 greater than that given by the aforesaid formula.

(iii) In any case in which the average permeability throughout the machinery space, as determined by detailed calculation, is less than that given by the aforesaid formula, the calculated value may be substituted. For the purposes of such calculation, the permeability of passenger spaces and crew spaces shall be taken to be 95, that of all spaces appropriated for cargo, coal or stores shall be taken to be 60 and that of double bottom, oil fuel and other tanks forming part of the structure of the ship shall be taken to be 95 or such lesser figure as the Central Government may approve in the case of that ship.

(b) Portions before and abaft the machinery space:

(i) the assumed average permeability throughout the portions of the ship before or abaft the machinery space shall be determined—

(a) by the following formula:

$$\frac{63 + 35}{v} \quad a \text{ where}$$

a—volume of the passenger spaces and crew spaces which are situated below the margin line before or abaft the machinery space, as the case may be, and

v—volume of the portion of the ship below the margin line before or abaft the machinery space, as the case may be; or

(b) if the Central Government so determines in the case of any ship—at any time not later than 40 days after a Surveyor has received a plan of the ship showing the watertight sub-division thereof, by detailed calculation for the purpose of which the permeability of spaces shall be assumed to be as follows:—

Passenger spaces	..	..	95
Crew spaces	..	..	95
Spaces appropriated to machinery	..	..	80
Spaces appropriated to cargo, coal stores or baggage rooms	..		60
Tanks forming part of the structure of the ship and double bottoms	..	..	95 or such lesser

figure as the  
Central Gov-  
ernment may  
permit in the  
case of any  
ship.

(ii) For the purposes of this paragraph a space within a passenger space or crew space shall be deemed to be a part thereof unless it is appropriated for other purposes and is enclosed by permanent steel bulkheads.

4. *Factor of Sub-division.*—(1) Subject to the provisions of sub-paragraph (4) of this paragraph, in the case of ships the length of which is 430 feet or more, the factor of sub-division F shall be determined by the following formula:—

$$F = A - \frac{(A-B)(Cs-23)}{100}$$

where A and B are respectively determined in accordance with the provisions of sub-paragraph (5) of this paragraph and Cs is the criterion numeral determined in accordance with the provisions of paragraph 5 of this Schedule: Provided that where in the case of any ship the factor F is less than 4 and the Central Government is satisfied that it is impracticable to apply the factor F in determining the permissible length of a compartment appropriated for machinery, the Central Government may allow an increased factor not exceeding .4 to be applied to that compartment.

(2) Subject to the provision of sub-paragraph (4) of this paragraph, in the case of ships the length of which is less than 430 feet but not less than 260 feet having a criterion numeral of not less than

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(hereinafter in this paragraph referred to as S) the factor of sub-division F shall be determined by the following formula:—

$$F = 1 - \frac{(1-B)(Cs-S)}{123-S}$$

where B is the factor determined in accordance with the provisions of sub-paragraph (5) of this paragraph and C is the criterion numeral determined in accordance with the provisions of paragraph 5 of this Schedule.

(3) In the case of ships the length of which is less than 430 feet but not less than 260 feet and having a criterion numeral less than S or in the case of ships the length of which is less than 260 feet the factor of sub-division shall be unity.

(4) In the case of a ship of any length which is intended to carry a number of passengers exceeding 12 but not exceeding—

$$\frac{L^2}{7000} \text{ or } 50$$

whichever is the lower, the factor of sub-division shall be determined in the manner provided in sub-paragraph (3) of this paragraph.

(5) For the purposes of this paragraph the factors A and B shall be determined by the following formulae:—

$$A = \frac{190}{L - 138} + .18 \quad (\text{where } L = 430 \text{ and upwards})$$

$$B = \frac{100}{L - 138} + .18 \quad (\text{where } L = 260 \text{ and upwards})$$

5. Criterion of Service.—The criterion numeral for ships to which this Part applies shall be determined by the following formulæ:—

when  $P_i$  is greater than  $P$

$$Cs = 72 \left\{ \frac{M + 2 P_i}{V + P_i - P} \right\}$$

and in all other cases

$$Cs = 72 \left\{ \frac{M + 2 P}{V} \right\}$$

where:

$Cs$ =the criterion numeral;

$M$ =the volume of the machinery space, with the addition thereto of the volume of any permanent oil fuel bunkers which may be situated above the inner bottom and before or abaft the machinery space;

$P$ =the volume of the passenger spaces and crew spaces below the margin line;

$V$ =volume of the ship below the margin line;

$N$ =number of passengers which the ship is intended to carry; and

$P_i = .6 LN$ .

Provided that:

- (a) where the value of  $.6LN$  is greater than the sum of  $P$  and the whole volume of the passenger spaces above the margin line, the figures to be taken as  $P_i$  shall be that sum or  $.4LN$  whichever is the greater;
- (b) values of  $Cs$  less than 23 shall be taken as 23; and
- (c) values of  $Cs$  greater than 123 shall be taken as 123.

6. Special Rules for Sub-division.—(1) Compartments exceeding the permissible length.

(a) A compartment may exceed its permissible length provided that the combined length of each pair of adjacent compartments to which the compartment in question is common does not exceed either the floodable length or twice the permissible length, whichever is the less.

(b) If one compartment of either of such pairs of adjacent compartments is situated inside the machinery space, and the other compartment thereof is situated outside the machinery space, the combined length of the two compartments shall be adjusted in accordance with the mean average permeability of the two portions of the ship in which the compartments are situated.

(c) Where the lengths of the two adjacent compartments are governed by different factors of sub-division, the combined length of the two compartments shall be determined proportionately.

(d) Where in any portion of a ship bulkheads required by these Rules to be watertight are carried to a higher deck than in the remainder of the ship,

separate margin lines may be used for calculating the floodable length of that portion of the ship, if—

- (i) the two compartments adjacent to the resulting step in the bulkhead deck are each within the permissible length, corresponding to their respective margin lines, and, in addition, their combined length does not exceed twice the permissible length determined by reference to the lower margin line of such compartments;
- (ii) the sides of the ship are extended throughout the ship's length to the deck corresponding to the uppermost margin line and all openings in the shell plating below the deck throughout the length of the ship comply with the requirements of Rule 33 of these Rules as if they were openings below the margin line.

(2) *Additional Sub-division at Forward End.*—In ships 430 feet in length and upwards, the watertight bulkhead next abaft the collision bulkhead shall be fitted at a distance from the forward perpendicular which is not greater than the permissible length appropriate to a compartment bounded by the forward perpendicular and such bulkhead.

(3) *Steps in Bulkheads.*—If a bulkhead required by these Rules to be watertight is stepped it shall comply with one of the following conditions:—

- (i) In ships having a factor of sub-division not greater than 9, the combined length of the two compartments separated by such bulkhead shall not exceed 90 per cent. of the floodable length or twice the permissible length whichever is the less. In ships having a factor of sub-division greater than 9, the combined length of the two compartments shall not exceed the permissible length.
- (ii) Additional sub-division is provided in way of the step to maintain the same measure of safety as that secured by a plane bulkhead; or
- (iii) The compartment over which the step extends does not exceed the permissible length corresponding to a margin line taken 3 inches below the step.

(4) *Recesses in Bulkheads.*—If any part of a recess lies outside vertical surfaces on both sides of the ship situated at a distance from the shell plating equal to one-fifth of the breadth of the ship and measured at right angles to the centre line at the level of the deepest sub-division load water line the whole of such recess shall be deemed to be a step in a bulkhead for the purposes of subparagraph (3) of this paragraph.

(5) *Equivalent plane bulkheads.*—Where a bulkhead required by these Rules to be watertight is recessed or stepped an equivalent plane bulkhead shall be assumed in determining the sub-division.

(6) *Minimum spacing of bulkhead.*—If the distance between two adjacent bulkheads required by these Rules to be watertight, or their equivalent plane bulkheads, or the distance between transverse planes passing through the nearest stepped portions of the bulkheads, is less than  $.03L+10$  feet, or 35 feet, or .1L, whichever is the least, only one of those bulkheads shall be regarded as forming part of the sub-division of the ship.

(7) *Allowance for local sub-division.*—Where in any ship a main transverse watertight compartment contains local sub-division and the Central Government is satisfied that, after any assumed side damage extending over a length of  $.03L+10$  feet, or 35 feet, or .1L, whichever is the least, the whole volume of the main compartment will not be flooded, a proportionate allowance may be made in the permissible length otherwise required for such compartment. In such a case the volume of effective buoyancy assumed on the undamaged side shall not be greater than that assumed on the damaged side.

### PART III

*Ships of Class II which are permitted by the Central Government in exercise of its power under paragraph 5 of Rule 6 of the Indian Merchant Shipping (Life Saving Appliances) Rules to carry persons in excess of the lifeboat capacity provided on board.*

7. *General Rules for Sub-Division.*—Subject to the modifications set forth in this Part the maximum length of compartments in ships to which this Part applies shall be determined as if they were ships to which Part II applies.

**8. Assumption of Permeability in Portions before and abaft the Machinery space.**—In ships to which this Part applies the assumed average permeability throughout the portions of the ship before and abaft the machinery space shall be determined—

(a) by the following formula:—

$$\frac{b}{95-35} - \frac{v}{v}$$

where

b=the volume of the spaces which are situated below the margin line before or abaft the machinery space, as the case may be, and above the tops of floors, inner bottom, or peak tanks, and which are appropriated for use as coal or oil fuel bunkers, store rooms, baggage rooms, mail rooms, chain lockers or fresh water tanks and of spaces appropriated for cargo if the Central Government is satisfied that the greater part of the volume of the space is intended to be occupied by cargo; and

v=the volume of the portion of the ship below the margin line before or abaft the machinery space, as the case may be; or

(b) If the Central Government so determine in the case of any ship at any time not later than 40 days after a Surveyor has received a plan of the ship showing the watertight sub-division thereof, by detailed calculation for the purpose of which the permeability of spaces shall be assumed to be as follows:—

Passenger spaces	..	..	95
Crew spaces	..	..	95
Spaces appropriated to machinery	..	..	80
Spaces appropriated to bunker coal, store or baggage rooms	..	..	60
Spaces appropriated to cargo, tanks, forming part of structure of the ship and doubled bottoms	..	95 or such lesser figure as the Central Government may permit in the case of any ship.	

**9. Factor of Sub-division.**—(1) Subject to the provisions of this paragraph, the factor of sub-division of ships to which this Part of this Schedule applies shall be the factor determined in the manner provided in paragraph 4 of this Schedule, or .5 whichever is the less: Provided that if the Central Government is satisfied in the case of any ship the length of which is less than 300 feet that it is impracticable to apply that factor to any compartment, it may allow a higher factor to be applied to that compartment.

(2) If in the case of any ship to which this Part applies the Central Government is satisfied that the quantity of cargo to be carried in the ship will be such as to render impracticable the application abaft the collision bulkhead of a factor of sub-division not exceeding .5, the factor of sub-division of the ship shall be determined as follows:—

(a) In the case of ships the length f which is 430 feet and upwards, by the formula:—

$$F = A - \frac{(A-BB) (Cs-23)}{100}$$

(b) in the case of ships the length of which is less than 430 feet but not less than 180 feet, and having a criterion numeral not less than S<sub>1</sub>, by the formula:—

$$F = 1 - \frac{(1-BB) (Cs-S_1)}{123-S_1}$$

For the purpose of the above formulae:

$$A = \frac{190}{L-198} + .18 \text{ (where } L=430 \text{ and upwards)}$$

$$BB = \frac{57.6}{L-108} + .20 \text{ (where } L=180 \text{ and upwards)}$$

$$S_1 = \frac{1950-4L}{10}$$

$C_s$  = the criterion numeral determined in accordance with paragraph 5 of this Schedule where  $P_1$  has the following values:

- (a)  $.6LN$  or  $125N$  whichever is the greater for berthed passengers.
- (b)  $125N$  for unberthed passengers.
- (c) in the case of ships the length of which is less than 430 feet but not less than 180 feet and having a criterion numeral less than  $S_1$ , and of all ships the length of which is less than 180 feet, the factor of sub-division shall be unity.

#### PART IV

10. *Ships of Classes III to V inclusive.*—Ships shall be as efficiently sub-divided as is possible having regard to the nature of the service for which they are intended. The requirements respecting sub-division are given in the following rules.

The degree of sub-division provided by these requirements varies with the length of the ship and with the services, in such manner that the highest degree of sub-division corresponds with the ships of greatest length primarily engaged in the carriage of passengers.

11. The method of sub-division shall follow Part II of this Schedule:

Provided that the Rules of the said part of the above Schedule are applied subject to the following:—

- (a) Uniform average permeability shall be determined according to paragraph 3(b) of Part II of this Schedule provided that where it is shown to the satisfaction of the Central Government that the permeability of one or more compartments of the portion of the ship before (or abaft) the machinery space is less than that by the formula

$$\frac{a}{63+35} \text{ the calculated values may be substituted for each of the}$$

compartments in that portion of the ship. For the purpose of such calculation, the permeability of passenger spaces shall be taken as 95, that of spaces containing machinery as 80, that of all cargo, coal and store spaces as 60, and that of double bottom oil fuel and other tanks at such value as may be approved in each case by the Central Government.

- (b) The Criterion of Service Numeral shall be determined by the following formula and not by those given in paragraph 5 of Part II of this Schedule:—

$$Cs = 72 \frac{M + 3/2 Pi}{V + Pi - P}$$

Where  $M$ =the volume of the machinery space with the addition thereto the volume of any permanent oil fuel tankers which may be situated above the inner bottom and before or abaft the machinery space.

$P$ =the whole volume of the passenger spaces below the margin line as defined.  $V$ =the whole volume of the ship below the margin line.  $Pi=P+7A-4LN$ .

Where  $A$ =the total area in square feet of the spaces measured in determining the number of unberthed passengers to be carried above the

margin line including the area of any compartment containing more than six berths. The area of the spaces occupied by galleys, mess rooms, latrines, wash places, baggage and store room, lavatories, hospitals, and the airing spaces for between deck passengers shall not be included.

Where  $L$ =the length of the ship, as defined in Part I of this Schedule.  
 $N$ =the total number of berths for berthed passengers carried above the margin line, a berthed passenger being defined as one accommodated in a compartment containing not more than six berths.

- (c) the provisions of sub-paragraph 4(3) of Part II of this Schedule shall apply also to ships of whatever length which are certified to carry  $L^2$  (in feet)

total number of passengers not exceeding \_\_\_\_\_ or 280,  
1260

whichever is the less, of which the number of berthed passengers  
 $L^2$  (in feet)  
shall not exceed \_\_\_\_\_ or 50, whichever is the less. In  
7000

ships of 430 feet in length and upwards to which this paragraph applies, the sub-division abaft the fore peak shall be governed by the factor unity.

- (d) In sub-paragraph 6(2), the words 'floodable length' shall be substituted for 'permissible length'.

12. In order that the required degree of sub-division shall be maintained, a load line corresponding to the approved sub-division draft shall be assigned and marked on the ships sides. A ship having spaces which are especially adapted for the accommodation of passengers and the carriage of cargo alternately may, if the owners desire, have one or more additional load lines assigned and marked to correspond with the sub-division draft, which the Central Government may approve for the alternative service conditions. The free board corresponding to each approved sub-division load line, and to conditions of service for which it is approved, shall be clearly indicated on the Safety Certificate. Sub-division load lines shall be marked and recorded in the manner provided in Rule 36 but load lines under these Rules shall be distinguished by the notation  $D_1$ ,  $D_2$ ,  $D_3$ , etc.

#### PART V

13. *Ships of Class VI.*—Subject to the modifications as set forth in this Part the maximum length of compartments in ships to which this Part applies shall be determined as if they were ships to which Part II applies.

—In ships to which this Part applies the assumed average  
length is as follows:—

(a) of the machinery space

(i) In ships propelled by internal combustion engines ..	85
(ii) In all other ships ..	80

(b) of spaces other than the machinery space ..	95
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15. *Factor of Sub-division.*—The factor of sub-division to which this Part applies shall be as follows:—

Length of ship in feet  
over 300..

*Factor of sub-division*

.5 for compartments in the machinery space and forward thereof	Unity
for all other compartments.	

Over 200 but not over 300 ..	.5 for compartments forward of the machinery space. Unity for all other compartments.
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200 and under ....	Unity.
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## SECOND SCHEDULE

*Stability in Damaged Condition*

**1. Calculation of Stability in Damaged Condition.**—The sufficiency of intact stability of every ship to which Part II of these Rules applies shall be determined by calculation which has regard to the design and construction of the ship and the damaged compartments, and which is in accordance with the following assumptions:—

- (a) the ship shall be assumed to be in the worst condition as regards stability which is likely to be experienced having regard to the intended service of the ship;
- (b) the volume permeabilities and surface permeabilities shall be assumed to be as follows:—

Spaces	Permeability
Appropriated to cargo, coal or stores ..	.. 60
Appropriated to accommodation for passengers and crew ..	.. 95
Appropriated to machinery ..	.. 85
Appropriated to liquids ..	.. 0 or 95, whichever results, in the more onerous requirements.

- (c) The minimum extent of damage shall be assumed to be as follows:—
  - (i) Longitudinal extent—10 feet plus 3 per cent. of the length of the ship, or 35 feet, or 10 per cent. of the length of the ship, whichever is the least.
  - (ii) Transverse extent—20 per cent. of the breadth of the ship (measured inboard from the ship's side at right angles to the centre line at the level of the deepest sub-division load water line).
  - (iii) Vertical extent—from the top of the double bottom upto the margin line.
  - (iv) If any damage of lesser extent than that indicated in the foregoing sub-paragraphs (i), (ii) and (iii) would result in a more severe condition regarding heel or loss of metacentric height, such damage shall be assumed for the purpose of the calculation.
- (d) Where the ship is fitted with decks, inner skins or longitudinal bulkheads of sufficient tightness to restrict the flow of water, regard shall be had to such restrictions in the calculation.

**2. Sufficiency of Stability in Damaged Condition.**—The intact stability of the ship shall be deemed to be sufficient if the aforesaid calculation shows that, after the assumed damage and after equalisation measures have been taken, the final condition of the ship is as follows:—

- (i) in the event of symmetrical flooding the metacentric height is positive;
- (ii) in the event of unsymmetrical flooding the heel does not exceed seven degrees;
- (iii) in the event of unsymmetrical flooding the margin line is not submerged.

## THIRD SCHEDULE

*Construction of Watertight Bulkheads, etc.*

## PART I

*Ships of Classes I and III*

**1. Strength and Construction.**—(1) Every bulkhead and other portion of the internal structure forming part of the watertight sub-division of the ship shall be of such strength and so constructed as to be capable of supporting, with an adequate margin of resistance, the pressure due to a head of water upto the margin line.

(2) Every such bulkhead and portion shall be constructed of mild steel, and if of riveted construction, shall comply with the requirements of paragraphs 2

to 6 inclusive of this Schedule, and if of welded construction shall not be of less strength, stiffness or efficiency than if it had been riveted and had complied with such requirements.

**2. Bulkheads.**—(1) Every bulkhead required by these Rules to be watertight shall be constructed with plating of thicknesses not less than those indicated in Table 1 of Part IV of this Schedule. If a bulkhead is at the end of a stokehold space in a coal burning ship, the lower part of the bulkhead plating to a height of at least 24 inches above the stokehold floor shall be at least .1 inch thicker than is required by the said Table. If a bulkhead is at the end of a coal bunker space, the lowest stroke thereof shall be at least 36 inches high and .1 inch thicker than is required by the said Table. In all other bulkheads the lowest stroke shall be at least .04 inch thicker than is required by the said Table and any limber plates shall be at least .1 inch thicker.

(2) Every boundary angle shall be at least .1 inch thicker than the thickness required by the said Table for the bulkhead plating to which it is attached.

(3) (a) Save as provided in Table 3 of Part IV of this Schedule, every such bulkhead shall be fitted with stiffeners which shall have brackets or lug end connections. If the stiffeners are spaced 30 inches apart, they shall comply with such of the specifications in Tables 2 and 3 of the said Part as apply to them in the circumstances: Provided that other forms of stiffeners may be used if they afford not less strength and stiffness than the stiffeners indicated in the said Tables. If any stiffeners are spaced otherwise than 30 inches apart on such a bulkhead, their strength and stiffness shall be increased or decreased, as the case may be, in direct proportion to their distance apart. Stiffeners shall not be spaced more than 24 inches apart on a collision bulkhead, or more than 36 inches apart on any other bulkhead.

(b) The lower end of each stiffener shall be attached to the shell plating to the inner bottom plating or to horizontal plating which will support it properly.

(c) At each deck level which forms the top of a system of stiffeners plating shall be so provided as to ensure horizontal rigidity in the bulkhead.

(d) In the case of bracketed hold stiffeners the lower bracket or its connecting angle shall extend over the floor adjacent to the bulkhead and the upper bracket shall be connected to an angle which extends over the beam space, or other equally effective means shall be adopted for securing structural rigidity.

(e) Where stiffeners are cut in way of watertight doors in the lower part of a bulkhead, the opening shall be properly framed and bracketed, and a tapered web plate or buttress, stiffened on its edge, shall be fitted at each side of the door from the base of the bulkhead to above the door opening.

(f) All brackets, lugs and other end connections for stiffeners shall comply with the requirements of Table 4 of Part IV of this Schedule.

(4) (a) The rivets in seams and connections of plating and boundary bars of all bulkheads required by these Rules to be watertight shall be spaced not more than  $4\frac{1}{2}$  diameters apart centre to centre, except in the case of the flange of a boundary angle, being the flange connected to the inner bottom plating, shell plating or deck plating, in which case they shall be spaced 5 diameters apart centre to centre.

(b) Boundary angles fitted more than 35 feet below the bulkhead deck shall be double riveted in both flanges except on parts of a bulkhead within a double bottom, and the vertical connection of plates so fitted shall be double riveted.

(c) The rivets connecting stiffeners, having bracket end connections, to bulkhead plating shall be spaced not more than 7 diameters apart centre to centre. All other stiffeners shall be connected to the bulkhead plating by rivets spaced not more than 4 diameters apart centre to centre for 15 per cent. of the length of the stiffeners at each end thereof and not more than 7 diameters apart centre to centre elsewhere.

(d) Where frames or beams pass through a bulkhead required by these Rules to be watertight, the bulkhead shall be made watertight without the use of wood or cement.

**3. Watertight Decks, Steps and Flats.**—(1) The horizontal plating of decks, steps and flats required by these Rules to be watertight shall be at least .04 inch thicker than that required for watertight bulkheads at corresponding levels.

(2) The beams of such decks, steps and flats shall be of sizes indicated for stiffeners spaced 30 inches apart in Table 3 of Part IV of this Schedule: Provided that beams divided into portions which are bracketed at each end may be

of the sizes indicated for such stiffeners in Table 2 of Part IV of this Schedule. If any beams are spaced otherwise than 30 inches apart, their strength and stiffness shall be increased or decreased, as the case may be, in direct proportion to their distance apart.

For the purposes of the said Tables the greatest distance between the points of support shall be deemed to be the length of the beam: Provided that, if a beam is bracketed, the length thereof for the purposes of the said Table 3 shall be reduced by the width of the brackets. The distance from the bulkhead deck to the deck, step or flat concerned, minus half the length of the beam, shall be deemed to be the height for the purposes of the said Tables.

(3) Adequate supports for such beams shall be provided by bulkheads, or by girders pillared where necessary, and the rivet connections of the pillars shall be sufficient to withstand the load due to water pressure.

(4) Where frames pass through a deck, step or flat required by these Rules to be watertight, such deck, step or flat shall be made watertight without the use of wood or cement.

4. *Watertight Recesses and Trunkways.*—Every recess and trunkway required by these Rules to be watertight shall be so constructed as to provide strength and stiffness at all parts not less than that required for watertight bulkheads at a corresponding level.

5. *Watertight Tunnels.*—(1) Every tunnel required by these Rules to be watertight shall be constructed with plating of thicknesses not less than those indicated in Table I of Part IV of this Schedule.

(2) Every such tunnel shall be fitted with stiffeners which, if spaced 36 inches apart, shall comply with such of the specifications in Table 5 of Part IV of this Schedule as apply to them in the circumstances: Provided that other forms of stiffeners may be used if they afford not less strength and stiffness than the stiffeners indicated in the said Table. If any stiffeners are spaced otherwise than 36 inches apart on such a tunnel their strength and stiffness shall be increased or decreased as the case may be in direct proportion to their distance apart. The feet of all stiffeners, however, spaced, shall overlap the tunnel base angle, and shall be attached thereto.

6. *Watertight Inner Skins.*—Every inner skin required by these Rules to be watertight shall be of such strength and construction as will enable it to withstand a head of water upto the margin line.

## PART II

### *Ships of Classes II, IV and V*

7. *General.*—Subject to the modifications set forth in this Part I of this Schedule shall apply in relation to ships of Classes II, IV and V as it applies in relation to ships of Classes I and III.

8. *Bulkheads, etc.*—(1) Every riveted portion of the ship's internal structure required by these Rules to be watertight shall be constructed as follows:

- (a) In ships not exceeding 150 feet in length, in accordance with Tables IA, 2A, 3A, 4 and 5A of Part IV of this Schedule.
- (b) In ships 250 feet in length and upwards, in accordance with Tables 1, 2, 3, 4 and 5 of Part IV of this Schedule.
- (c) In ships between 150 feet and 250 feet in length, in manner determined by interpolation between the two foregoing standards: Provided that in ships of any length the sub-division of which is determined in accordance with sub-paragraph (1) of paragraph 9 of the Second Schedule to these Rules, every riveted portion of such internal structure may be constructed in accordance with Tables 1A, 2A, 3A, 4 and 5A of Part IV of this Schedule.

(2) Any bulkheads required by these Rules to be watertight in ships not exceeding 150 feet in length and in ships the sub-division of which is determined in accordance with sub-paragraph (1) of paragraph 9 of the Second Schedule to these Rules may, if the stiffeners comply with the specifications in Table 3B of Part IV of this Schedule, be fitted with stiffeners not having bracket or lug end connections.

## PART III

## Ships of Class VI

9. *General.*—Subject to the modifications set forth in this Part of this Schedule, Part I of this Schedule shall apply in relation to ships of Class VI, as it applies in relation to ships of Class I.

10. *Bulkheads, etc.*—(1) Any bulkheads required by these Rules to be watertight may be fitted with stiffeners not having bracket or lug end connections.

(2) Every riveted portion of the ship's internal structure required by these Rules to be watertight shall be constructed in accordance with such of the provisions of Tables 1A, 2A, 3A, 3B, 4 and 5A of Part IV of this Schedule as apply to it in the circumstances.

## PART IV

## TABLE I

(paragraphs 2, 5 and 8 this Schedule)

## THICKNESSES ON BULKHEAD AND TUNNEL PLATING

## Plating of Collision Bulkhead:

Stiffeners spaced 24 inches apart.

## Plating of Bulkheads (other than the Collision Bulkhead) and Flat Plating of Tunnels:

Stiffeners spaced 30 inches apart

## Curved Plating of Tunnels:

Stiffeners spaced 36 inches apart

## Plating of Bulkheads (other than the Collision Bulkhead) and Flat Plating of Tunnels:

Stiffeners spaced 36 inches apart

Depth at Middle Line from Bulkhead Deck to Lower Edge of Plate in feet	Thickness in inches	Depth at Middle Line from Bulkhead Deck to Lower Edge of Plate in feet	Thickness in inches
Above	Not above	Above	Not above
8	.26	7	.28
12	.28	10.5	.30
16	.30	14	.32
20	.32	17.5	.34
24	.34	21	.36
28	.36	24.5	.38
32	.38	28	.40
36	.40	31.5	.42
40	.42	35	.44
44	.44	38.5	.46
48	.46	42	.48
52	.48	45.5	.50
56	.50	49	.52
		52.5	.54
		56	.56
		59.5	.58

If the stiffeners are spaced otherwise than is specified above, the thicknesses of the plating shall be such as will result in a strength equivalent to that resulting from the thicknesses and spacings specified above.

## TABLE

(paragraphs 2, 3 and 8 of this Schedule)

SIZES OF BULKHEAD STIFFENERS SPACED 30 INCHES APART AND FITTED WITH BRACKET END CONNECTIONS AT TOP AND BOTTOM IN ACCORDANCE WITH TABLE 4

Overall Length of Stiffener, including End Connections, in feet	Height of Bulkhead Deck above Top of Stiffener, in feet				
	0	2	4	6	8
8	4 x 3 x .30	4½ x 3 x .30	4½ x 3 x .34	5 x 3 x .32	6 x 3 x .32
9	4½ x 3 x .32	5 x 3 x .32	5 x 3 x .36	6 x 3 x .32	6 x 3 x .36
10	5 x 3 x .34	6 x 3 x .32	6 x 3 x .34	6 x 3 x .38	5½ x 3 x .32
11	6 x 3 x .32	6 x 3 x .34	5½ x 3 x .32	5½ x 3 x .38	6 x 3 x .34
12	6 x 3 x .38	5½ x 3 x .34	6 x 3 x .34	6 x 3½ x .35	7 x 3 x .33
13	5½ x 3 x .37	6 x 3 x .35	7 x 3 x .33	7 x 3 x .33	7 x 3 x .38
14	6 x 3 x .35	7 x 3 x .33	7 x 3 x .36	7 x 3 x .40	8 x 3 x .35
15	7 x 3 x .33	7 x 3 x .36	8 x 3 x .35	8 x 3 x .35	8 x 3 x .40
16	7 x 3 x .36	8 x 3 x .35	8 x 3 x .37	8 x 3 x .42	9 x 3 x .38
17	8 x 3 x .35	8 x 3 x .37	8 x 3½ x .46	9 x 3½ x .38	9 x 3½ x .40
18	8 x 3 x .37	8 x 3½ x .46	9 x 3½ x .38	9 x 3½ x .44	9 x 3½ x .51
19	8 x 3½ x .46	9 x 3½ x .38	9 x 3½ x .45	10 x 3½ x .40	10 x 3½ x .42
20	9 x 3½ x .38	9 x 3½ x .51	10 x 3½ x .40	11 x 3½ x .43	11 x 3½ x .43
21	9 x 3½ x .51	10 x 3½ x .40	10 x 3½ x .50	11 x 3½ x .43	11 x 3½ x .44
22	10 x 3½ x .40	10 x 3½ x .50	11 x 3½ x .43	11 x 3½ x .50	12 x 3½ x .31 x .38
23	10 x 3½ x .50	11 x 3½ x .43	11 x 3½ x .50	12 x 3½ x .31 x .38	12 x 3½ x .31 x .50
24	11 x 3½ x .43	11 x 3½ x .50	12 x 3½ x .31 x .38	12 x 3½ x .31 x .44	12 x 3½ x .31 x .44

← Channels →

(1) The sizes of stiffeners are specified in inches.

(2) Sizes for intermediate lengths of stiffeners and heights of bulkhead deck shall be determined by interpolation.

(3) In the case of Channel Sections the lower thickness is that of the web and the upper thickness that of the flange.

(4) The above stiffeners shall comply with the specifications set forth in British Standard Specifications Numbers 4A—1934, 6—1924 and 4—1932 applicable to stiffeners of the scantlings and type indicated.

TABLE 2—*continued.*

SIZES OF BULKHEAD STIFFENER, 1 ACED 30 INCHES A PART AND FITTED WITH BRACKET END CONNECTIONS AT TOP AND BOTTOM IN ACCORDANCE WITH TABLE 4

Overall Length of Stiffener, including End Connections, in feet	Height of Bulkhead Deck above Top of Stiffener, in feet			
	10	12	14	16
Angles	6×3×·32	6×3×·34	6×3×·36	5½×3×·32
	6×3×·38	5½×3×·32	5½×3×·37	6×3×·34
	6×3×·34	6×3×·35	6×3½×·35	7×3×·33
	7×3×·33	7×3×·33	7×3×·34	7×3×·38
	7×3×·36	7×3×·38	8×3×·35	8×3×·35
	8×3×·35	8×3×·35	8×3×·37	8×3×·42
	8×3×·37	8×3×·42	8×3½×·46	9×3½×·38
	8×3½×·46	9×3½×·38	9×3½×·38	9×3½×·45
	9×3½×·38	9×3½×·44	9×3½×·51	10×3½×·40
	9×3½×·51	10×3½×·40	10×3½×·42	11×3½×·43
Bulk Angles	10×3½×·40	10×3½×·50	11×3½×·43	11×3½×·44
	11×3½×·43	11×3½×·43	11×3½×·52	12×3½×3½×·50 ·38
	11×3½×·43	11×3½×·52	12×3½×3½×·50 ·38	12×3½×3½×·50 ·42
	11×3½×·54	12×3½×3½×·50 ·38	12×3½×3½×·60 ·44	12×3½×3×·60 ·46
	12×3½×3½×·50 ·39	12×3½×3½×·60 ·44	12×4×4×·60 ·40	12×4×4×·60 ·48
	12×3½×3½×·60 ·44	12×4×4×·60 ·40	12×4×4×·60 ·50	12×4×4×·60 ·67
	12×4×4×·60 ·48	12×4×4×·60 ·54	12×4×4×·60 ·70	15×4×4×·62 ·41

(1) The sizes of stiffeners are specified in inches.

(2) Sizes for intermediate lengths of stiffeners and heights of bulkhead deck shall be determined by interpolation.

(3) In the case of Channel Sections the lower thickness is that of the web and the upper thickness that of the flange.

(4) The above stiffeners shall comply with the specifications set forth in British Standard Specifications Numbers 4A—1934, 6—1924 and 4—1932 applicable to stiffeners of the scantlings and type indicated.

TABLE 2—*contd.*

SIZES OF BULKHEAD STIFFENERS SPACED 30 INCHES APART AND FITTED WITH BRACKET END CONNECTIONS AT TOP AND BOTTOM IN ACCORDANCE WITH TABLE 4

Overall Length of Stiffener, including End Con- nections, in feet	Height of Bulkhead Deck above Top of Stiffener, in feet			
	18	20	22	24
8	5½ × 3 × .32	5½ × 3 × .37	6 × 3 × .34	6 × 3 × .35
9	6 × 3 × .35	7 × 3 × .33	7 × 3 × .33	7 × 3 × .33
10	7 × 3 × .33	7 × 3 × .36	7 × 3 × .40	8 × 3 × .35
11	8 × 3 × .35	8 × 3 × .35	8 × 3 × .37	8 × 3 × .37
12	8 × 3 × .37	8 × 3 × .40	8 × 3 × .46	9 × 3½ × .38
13	8 × 3½ × .46	9 × 3½ × .38	9 × 3½ × .38	9 × 3½ × .44
14	9 × 3½ × .38	9 × 3½ × .51	9 × 3½ × .51	10 × 3½ × .40
15	9 × 3½ × .51	10 × 3½ × .40	10 × 3½ × .50	11 × 3½ × .43
16	10 × 3½ × .50	11 × 3½ × .43	11 × 3½ × .43	11 × 3½ × .44
17	11 × 3½ × .43	11 × 3½ × .52	11 × 3½ × .52	12 × 3½ × 3½ × .50 .38
18	11 × 3½ × .52	12 × 3½ × 3½ .38	12 × 3½ × 3½ × .50 .38	12 × 3½ × 3½ .44
19	12 × 3½ × 3½ × .50 .38	12 × 3½ × 3½ × .60 .44	12 × 3½ × 3½ × .60 .44	12 × 4 × 4 × .40
20	12 × 3½ × 3½ × .60 .44	12 × 4 × 4 × .40	12 × 4 × 4 × .48	12 × 4 × 4 × .52
21	12 × 4 × 4 × .48	12 × 4 × 4 × .60 .50	12 × 4 × 4 × .60 .67	12 × 4 × 4 × .70
22	12 × 4 × 4 × .60 .67	12 × 4 × 4 × .60 .70	15 × 4 × 4 × .62 .41	15 × 4 × 4 × .41
23	15 × 4 × 4 × .62 .41	15 × 4 × 4 × .62 .41	15 × 4 × 4 × .62 .46	15 × 4 × 4 × .50
24	15 × 4 × 4 × .62 .46	15 × 4 × 4 × .62 .48		

(1) The sizes of stiffeners are specified in inches.

(2) Sizes for intermediate lengths of stiffeners and heights of bulkhead deck shall be determined by interpolation.

(3) In the case of Channel Section the lower thickness is that of the web and the upper thickness that of the flange.

(4) The ~~above~~ stiffeners shall comply with the specifications set forth in British Standard Specifications Numbers 6—1924 and 4—1932 applicable to stiffeners of the scantlings and type indicated.

TABLE 2—*contd*

SIZES OF BULKHEAD STIFFENERS SPACED 30 INCHES APART AND FITTED WITH BRACKET END CONNECTIONS AT TOP AND BOTTOM IN ACCORDANCE WITH TABLE 4

Overall Length of Stiffener, including End Connections, in feet	Height of Bulkhead Deck above Top of stiffener, in feet			
	26	28	30	32
8	6 x 3 x .39	7 x 3 x .33	7 x 3 x .33	7 x 3 x .33
9	7 x 3 x .36	7 x 3 x .40	8 x 3 x .35	8 x 3 x .35
10	8 x 3 x .35	8 x 3 x .35	8 x 3 x .37	8 x 3 x .40
11	8 x 3 x .42	8 x 3 x .46	9 x 3 x .38	9 x 3 x .38
12	9 x 3 x .38	9 x 3 x .38	9 x 3 x .45	9 x 3 x .51
13	9 x 3 x .51	10 x 3 x .40	10 x 3 x .40	10 x 3 x .42
14	10 x 3 x .42	10 x 3 x .50	11 x 3 x .43	11 x 3 x .43
15	11 x 3 x .43	11 x 3 x .44	11 x 3 x .50	11 x 3 x .54
16	11 x 3 x .52	12 x 3 x .38	12 x 3 x .50	12 x 3 x .50
17	12 x 3 x .50	12 x 3 x .44	12 x 3 x .50	12 x 3 x .46
18	12 x 3 x .60	12 x 4 x 4 x .40	12 x 4 x 4 x .48	12 x 4 x 4 x .50
19	12 x 4 x 4 x .60	12 x 4 x 4 x .52	12 x 4 x 4 x .67	12 x 4 x 4 x .70
20	12 x 4 x 4 x .60	12 x 4 x 4 x .70	15 x 4 x 4 x .41	15 x 4 x 4 x .41
21	15 x 4 x 4 x .62	15 x 4 x 4 x .41	15 x 4 x 4 x .46	15 x 4 x 4 x .50
22	15 x 4 x 4 x .62	15 x 4 x 4 x .50		
23				
24				

(1) The sizes of stiffeners are specified in inches.

(2) Sizes for intermediate lengths of stiffeners and heights of bulkhead deck shall be determined by interpolation.

(3) In the case of Channel Sections the lower thickness is that of the web and the upper thickness that of the flange.

(4) The above stiffeners shall comply with the specifications set forth in British Standard Specifications Numbers 6—1924 and 4—1932 applicable to stiffeners of the scantlings and type indicated.

TABLE 2—*continued*

SIZES OF BULKHEAD STIFFENERS SPACED 30 INCHES APART AND FITTED WITH BRACKET END CONNECTIONS AT TOP AND BOTTOM IN ACCORDANCE WITH TABLE 4

Overall Length of Stiffener, including End Connections, in feet	Height of Bulkhead Deck above Top of Stiffener, in feet			
	34	36	38	40
Bulb Angles Channels	8 × 3 × .36	7 × 3 × .36	7 × 3 × .40	8 × 3 × .35
	8 × 3 × .35	8 × 3 × .37	8 × 3 × .37	8 × 3 × .40
	8 × 3½ × .44	8 × 3½ × .46	9 × 3½ × .38	9 × 3½ × .38
	9 × 3½ × .38	9 × 3½ × .44	9 × 3½ × .45	9 × 3½ × .51
	9 × 3½ × .51	10 × 3½ × .40	10 × 3½ × .40	10 × 3½ × .50
	10 × 3½ × .50	11 × 3½ × .43	11 × 3½ × .43	11 × 3½ × .43
	11 × 3½ × .44	11 × 3½ × .50	11 × 3½ × .54	12 × 3½ × 3½ × .50
	12 × 3½ × .50	12 × 3½ × .50	12 × 3½ × .50	12 × 3½ × .44
	12 × 3½ × .38	12 × 3½ × 3½ × .38	12 × 3½ × 3½ × .39	12 × 3½ × 3½ × .60
	12 × 3½ × .60	12 × 3½ × .44	12 × 4 × 4 × .60	12 × 4 × 4 × .48
	12 × 4 × 4 × .48	12 × 4 × 4 × .48	12 × 4 × 4 × .52	12 × 4 × 4 × .67
	12 × 4 × 4 × .60	12 × 4 × 4 × .67	12 × 4 × 4 × .70	15 × 4 × 4 × .41
	15 × 4 × 4 × .41	15 × 4 × 4 × .41	15 × 4 × 4 × .46	15 × 4 × 4 × .62
	15 × 4 × 4 × .62	15 × 4 × 4 × .48		

(1) The sizes of stiffeners are specified in inches.

(2) Sizes for intermediate lengths of stiffeners and heights of bulkhead deck shall be determined by interpolation.

(3) In the case of Channel Sections the lower thickness is that of the web and the upper thickness that of the flange.

(4) The above stiffeners shall comply with the specifications set forth in British Standard Specifications Numbers 6—1924 and 4—1932 applicable to stiffeners of the scantlings and type indicated.

TABLE 3

(paragraphs 2, 3 and 8 of this Schedule)

SIZES OF BULKHEAD STIFFENERS SPACED 30 INCHES APART AND FITTED WITH LUG END CONNECTIONS AT TOP AND BOTTOM IN ACCORDANCE WITH TABLE 4

Overall Length of Stiffener, including End Connections, in feet	C	Height of Bulkhead Deck above Top of Stiffener, in feet			
		2	4	6	8
8 Angles	*4½×3×·34	5×3×·36	6×3×·32	6×3×·38	5½×3×·34
9 Angles	*6×3×·32	6×3×·32	5½×3×·34	5½×3×·38	6×3×·34
10 Angles	*6×3×·38	5½×3×·37	6×3×·34	7×3×·33	7×3×·33
11	5½×3×·38	6×3½×·35	7×3×·33	7×3×·36	7×3×·40
12	6×3×·39	7×3×·33	7×3×·38	8×3×·35	8×3×·35
13	7×3×·33	7×3×·40	8×3×·35	8×3×·40	8×3½×·46
14	7×3×·41	8×3×·35	8×3½×·46	9×3½×·38	9×3½×·40
15	8×3×·35	8×3×·47	9×3½×·38	9×3½×·45	10×3½×·40
16	8×3½×·46	9×3½×·38	9×3½×·51	10×3½×·40	10×3½×·48
17 Bulb Angles	9×3½×·40	9×3½×·51	10×3½×·42	11×3½×·43	11×3½×·43
18	9×3½×·51	10×3½×·45	11×3½×·43	11×3½×·44	11×3½×·56
19	10×3½×·42	11×3½×·43	11×3½×·45	12×3½×3½×·50	12×3½×3½×·39
20	11×3½×·43	11×3½×·48	12×3½×3½×·50	12×3½×3½×·60	12×3½×3½×·60
21	11×3½×·48	12×3½×3½×·50	12×3½×3½×·60	12×4×4×·60	12×4×4×·48
22 Channels	12×3½×3½×·50	12×3½×3½×·60	12×3½×3½×·60	12×4×4×·52	12×4×4×·60
23	12×3½×3½×·60	12×4×4×·60	12×4×4×·60	12×4×4×·70	15×4×4×·62
24	12×4×4×·60	12×4×4×·60	12×4×4×·60	15×4×4×·62	15×4×4×·48

## Channels

(1) The sizes of stiffeners are specified in inches.

(2) Sizes for intermediate lengths of stiffeners and heights of bulkhead deck shall be determined by interpolation.

(3) The ends of upper between deck stiffeners marked\* may be riveted to boundary bars only without lug end connections.

(4) In the case of Channel Sections the lower thickness is that of the web and the upper thickness that of the flange.

(5) The above stiffeners shall comply with the specifications set forth in British Standard Specifications Number 4A—1934, 6—1924 and 4—1932 applicable to stiffeners of the scantlings and type indicated.

TABLE 3—continued

SIZES OF BULKHEAD STIFFENERS SPACED 30 INCHES APART AND FITTED WITH LUG END CONNECTIONS AT TOP AND BOTTOM IN ACCORDANCE WITH TABLE 4

Overall Length of Stiffener, including End Connections, in feet	Height of Bulkhead Deck above Top of Stiffener, in feet			
	10	12	14	16
Bulb Angles	5½ × 3 × .38	6 × 3 × .34	6 × 3 × .40	7 × 3 × .33
	6 × 3 × .39	7 × 3 × .33	7 × 3 × .36	7 × 3 × .36
	7 × 3 × .36	7 × 3 × .40	8 × 3 × .35	8 × 3 × .35
	8 × 3 × .35	8 × 3 × .37	8 × 3 × .42	8 × 3½ × .46
	8 × 3 × .42	9 × 3½ × .38	9 × 3½ × .38	9 × 3½ × .40
	9 × 3½ × .38	9 × 3½ × .44	9 × 3½ × .51	10 × 3½ × .49
	9 × 3½ × .51	10 × 3½ × .40	10 × 3½ × .45	11 × 3½ × .43
	10 × 3½ × .42	10 × 3½ × .50	11 × 3½ × .43	11 × 3½ × .45
	11 × 3½ × .43	11 × 3½ × .44	11 × 3½ × .45	12 × 3½ × 3½ × .50 .38
	11 × 3½ × .48	11 × 3½ × .56	12 × 3½ × 3½ × .50 .39	12 × 3½ × 3½ × .60 .44
Channels	12 × 3½ × 3½ × .50 .38	12 × 3½ × 3½ × .60 .44	12 × 4 × 4 × .60 .40	12 × 4 × 4 × .60 .48
	12 × 3½ × 3½ × .60 .44	12 × 4 × 4 × .60 .48	12 × 4 × 4 × .60 .62	12 × 4 × 4 × .60 .67
	12 × 4 × 4 × .60 .48	12 × 4 × 4 × .60 .67	12 × 4 × 4 × .60 .70	15 × 4 × 4 × .62 .41
	12 × 4 × 4 × .60 .67	15 × 4 × 4 × .62 .41	15 × 4 × 4 × .62 .41	15 × 4 × 4 × .62 .50
22	15 × 4 × 4 × .62 .41	15 × 4 × 4 × .62 .46		
23	15 × 4 × 4 × .62 .46			
24				

(1) The sizes of stiffeners are specified in inches.

(2) Sizes for intermediate lengths of stiffeners and heights of bulkhead deck shall be determined by interpolation.

(3) In the case of Channel Sections the lower thickness is that of the web and the upper thickness that of the flange.

(4) The above stiffeners shall comply with the specifications set forth in British Standard Specifications Numbers 6—1924 and 4—1932 applicable to stiffeners of the scantlings and type indicated.

TABLE 3—continued

SIZES OF BULKHEAD STIFFENERS SPACED 30 INCHES APART AND FITTED WITH LUG END CONNECTIONS AT TOP AND BOTTOM IN ACCORDANCE WITH TABLE 4

Overall Length of Stiffener, including End Connections, in feet	Height of Bulkhead Deck above Top of Stiffener, in feet			
	18	20	22	24
Bulb Angles	7×3×·33	7×3×·36	7×3×·38	7×3×·41
	7×3×·46	8×3×·35	8×3×·37	8×3×·40
	8×3×·40	8×3½×·46	9×3½×·38	9×3½×·38
	9×3½×·38	9×3½×·40	9×3½×·45	9×3½×·51
	9×3½×·51	10×3½×·40	10×3½×·42	10×3½×·46
	10×3½×·45	11×3½×·43	11×3½×·43	11×3½×·44
	11×3½×·43	11×3½×·45	11×3½×·55	12×3½×3½×·50 ·38
	11×3½×·56	12×3½×3½×·50 ·38	12×3½×3½×·60 ·44	12×3½×3½×·60 ·44
	12×3½×3½×·50 ·42	12×3½×3½×·60 ·44	12×4×4×·60 ·40	12×4×4×·60 ·48
	12×4×4×·60 ·40	12×4×4×·60 ·48	12×4×4×·60 ·67	12×4×4×·60 ·70
	12×4×4×·60 ·67	12×4×4×·60 ·70	15×4×4×·62 ·41	15×4×4×·62 ·41
	15×4×4×·62 ·41	15×4×4×·62 ·41	15×4×4×·62 ·46	
Chamels	15×4×4×·62 ·46	15×4×4×·62 ·53		

(1) The sizes of stiffeners are specified in inches.

(2) Sizes for intermediate lengths of stiffeners and heights of bulkhead deck shall be determined by interpolation.

(3) In the case of Chamel Sections the lower thickness is that of the web and the upper thickness that of the flange.

(4) The above stiffeners shall comply with the specifications set forth in British Standard Specifications Numbers 6-1924 and 4-1932 applicable to stiffeners of the scantlings and type indicated.

TABLE 3—*continued*

SIZES OF BULKHEAD STIFFENERS SPACED 30 INCHES APART AND FITTED WITH LUG END CONNECTIONS AT TOP AND BOTTOM IN ACCORDANCE WITH TABLE 4

Overall Length of Stiffener, including End Connections, in feet	Height of Bulkhead Deck above Top of Stiffener, in feet			
	26	28	30	32
Bulb Angle	8 × 3 × .35	8 × 3 × .35	8 × 3 × .37	8 × 3 × .40
	9 × 3½ × .46	9 × 3½ × .38	9 × 3½ × .38	9 × 3½ × .38
	10 × 3½ × .40	9 × 3½ × .45	9 × 3½ × .51	10 × 3½ × .40
	11 × 3½ × .40	10 × 3½ × .42	10 × 3½ × .50	11 × 3½ × .43
	12 × 3½ × .50	11 × 3½ × .43	11 × 3½ × .45	11 × 3½ × .52
	13 × 3½ × .52	11 × 3½ × .55	12 × 3½ × 3½ × .50 12 × 3½ × 3½ × .38	12 × 3½ × 3½ × .50 12 × 3½ × 3½ × .42
	14 × 3½ × 3½ × .50 .42	12 × 3½ × 3½ × .60 .44	12 × 3½ × 3½ × .60 .44	12 × 4 × 4 × .60 .40
	15 × 4 × 4 × .60 .40	12 × 4 × 4 × .60 .48	12 × 4 × 4 × .60 .52	12 × 4 × 4 × .60 .67
	16 × 4 × 4 × .60 .67	12 × 4 × 4 × .60 .67	15 × 4 × 4 × .62 .41	15 × 4 × 4 × .62 .41
	17 × 4 × 4 × .62 .41	15 × 4 × 4 × .62 .41	15 × 4 × 4 × .62 .46	15 × 4 × 4 × .62 .50
Channels	18 × 4 × 4 × .62 .46	15 × 4 × 4 × .62 .53		
24				

(1) The sizes of stiffeners are specified in inches.

(2) Sizes for intermediate lengths of stiffeners and heights of bulkhead deck shall be determined by interpolation.

(3) In the case of Channel Sections the lower thickness is that of the web and the upper thickness that of the flange.

(4) The above stiffeners shall comply with the specifications set forth in British Standard Specifications Numbers 6-1924 and 4-1932 applicable to stiffeners of the scantlings and type indicated.

TABLE 3—*continued*

SIZES OF BULKHEAD STIFFENERS SPACED 30 INCHES APART AND FITTED WITH LUG END CONNECTIONS AT TOP AND BOTTOM IN ACCORDANCE WITH TABLE 4

Overall Length of Stiffener, including End Connections, in feet	Height of Bulkhead Deck above Top of Stiffener, in feet			
	34	36	38	40
8	8 × 3 × .44	9 × 3½ × .38	9 × 3½ × .38	9 × 3½ × .38
9	9 × 3½ × .40	9 × 3½ × .45	9 × 3½ × .51	10 × 3½ × .40
10	10 × 3½ × .40	10 × 3½ × .42	10 × 3½ × .50	11 × 3½ × .43
11	11 × 3½ × .43	11 × 3½ × .43	11 × 3½ × .45	11 × 3½ × .52
12	11 × 3½ × .55. <sup>5</sup> <sub>.3</sub>	12 × 3½ × 3½ × .50 <sup>.38</sup>	12 × 3½ × 3½ × .50 <sup>.39</sup>	12 × 3½ × 3½ × .60 <sup>.44</sup>
13	12 × 3½ × 3½ × .60 <sup>.44</sup>	12 × 3½ × 3½ × .60 <sup>.44</sup>	12 × 3½ × 3½ × .60 <sup>.46</sup>	12 × 4 × 4 × .60 <sup>.48</sup>
14	12 × 4 × 4 × .60 <sup>.48</sup>	12 × 4 × 4 × .60 <sup>.50</sup>	12 × 4 × 4 × .60 <sup>.67</sup>	12 × 4 × 4 × .60 <sup>.67</sup>
15	12 × 4 × 4 × .60 <sup>.67</sup>	15 × 4 × 4 × .62 <sup>.41</sup>	15 × 4 × 4 × .62 <sup>.41</sup>	15 × 4 × 4 × .62 <sup>.46</sup>
16	15 × 4 × 4 × .62 <sup>.46</sup>	15 × 4 × 4 × .62 <sup>.46</sup>	15 × 4 × 4 × .62 <sup>.50</sup>	
17				
18				
19				
20				
21				
22				
23				
24				

(1) The sizes of stiffeners are specified in inches.

(2) Sizes for intermediate lengths of stiffeners and heights of bulkhead deck shall be determined by interpolation.

(3) In the case of Channel Sections the lower thickness is that of the web and the upper thick ness that of the flange.

(4) The above stiffeners shall comply with the specifications set forth in British Standard Specifications Numbers 6 1924 and 4-1932 applicable to stiffeners of the scantlings and type indicated.

TABLE 4  
(paragraphs, 2, 8 and 10 of this Schedule)

## END CONNECTIONS FOR STIFFENERS

Type and Depth of Stiffener	Bracket End / Connections			Lug End Connections
	Thickness of Bracket in inches	Width of Flange in inches	Number and Size of Rivets in each arm of Bracket	Number and Size of Rivets in Lugs
Angles 6" and under . . .	.34		3@ $\frac{1}{4}$ " diameter	2@ $\frac{1}{2}$ " diameter
Bulb Angles 6" and under . . .	.36		3@ $\frac{1}{4}$ " ,,	2@ $\frac{1}{2}$ " ,,"
Bulb Angles 7" . . .	.40		4@ $\frac{1}{4}$ " ,,	3@ $\frac{1}{2}$ " ,,"
," ,," 8" . . .	.42		5@ $\frac{1}{4}$ " ,,	3@ $\frac{1}{2}$ " ,,"
," ,," 9" . . .	↑ .34	2 $\frac{1}{2}$	6@ $\frac{1}{4}$ " ,,	4@ $\frac{1}{2}$ " ,,"
," ,," 10" . . .	.36	2 $\frac{1}{2}$	7@ $\frac{1}{4}$ " ,,	4@ $\frac{1}{2}$ " ,,"
," ,," 11" . . .	.38	2 $\frac{1}{2}$	7@ $\frac{1}{4}$ " ,,	4@ $\frac{1}{2}$ " ,,"
," ,," 12" . . .	.4	3	8@ $\frac{1}{4}$ " ,,	5@ $\frac{1}{2}$ " ,,"
Channels 12" X 3 $\frac{1}{2}$ · 3 $\frac{1}{2}$ X . . .	Flange ↓ .4	3	9@ $\frac{1}{4}$ " ,,	6@ $\frac{1}{2}$ " ,,"
," 12" X 4" X 4" . . .	.4	3	10@ $\frac{1}{4}$ " ,,	7@ $\frac{1}{2}$ " ,,"
," 15" X 4" X 4" . . .	↓ .44	3 $\frac{1}{2}$	13@ $\frac{1}{4}$ " ,,	8@ $\frac{1}{2}$ " ,,"

(1) The distance from the heel of the boundary bar to the extremities of the arms of the bracket shall not be less than two and one-half times the depth of the stiffener to which the bracket is connected.

(2) The overlap of stiffeners on brackets shall not be less than .12 of the span.

TABLE 5  
(paragraphs 5 and 8 of this Schedule)  
SIZES OF TUNNEL STIFFENERS SPACED 36 INCHES APART

Mean Height from Base of Tunnel to Bulkhead Deck in feet	Height from Base of Tunnel to the Top of Flat Side in feet					
	3	4	5	6	7	8
12	3 $\times$ 2 $\frac{1}{2}$ $\times$ .24	4 $\times$ 2 $\frac{1}{2}$ $\times$ .26	4 $\frac{1}{2}$ $\times$ 3 $\times$ .30	5 $\times$ 3 $\times$ .34	6 $\times$ 3 $\times$ .32	5 $\frac{1}{2}$ $\times$ 3 $\times$ .32
16	3 $\frac{1}{2}$ $\times$ 2 $\frac{1}{2}$ $\times$ .25	4 $\times$ 3 $\times$ .30	5 $\times$ 3 $\times$ .32	6 $\times$ 3 $\times$ .32	5 $\frac{1}{2}$ $\times$ 3 $\times$ .32	6 $\times$ 3 $\times$ .34
20	3 $\frac{1}{2}$ $\times$ 2 $\frac{1}{2}$ $\times$ .26	4 $\frac{1}{2}$ $\times$ 3 $\times$ .30	6 $\times$ 3 $\times$ .32	6 $\times$ 3 $\times$ .38	6 $\times$ 3 $\times$ .34	7 $\times$ 3 $\times$ .33
24	4 $\times$ 2 $\frac{1}{2}$ $\times$ .28	5 $\times$ 3 $\times$ .32	6 $\times$ 3 $\times$ .32	5 $\frac{1}{2}$ $\times$ 3 $\times$ .37	6 $\times$ 3 $\times$ .35	7 $\times$ 3 $\times$ .36
28	4 $\times$ 3 $\times$ .30	5 $\times$ 3 $\times$ .36	6 $\times$ 3 $\times$ .40	6 $\times$ 3 $\times$ .34	7 $\times$ 3 $\times$ .33	8 $\times$ 3 $\times$ .35
32	4 $\frac{1}{2}$ $\times$ 3 $\times$ .30	6 $\times$ 3 $\times$ .32	5 $\frac{1}{2}$ $\times$ 3 $\times$ .37	7 $\times$ 3 $\times$ .33	7 $\times$ 3 $\times$ .38	8 $\times$ 3 $\times$ .37
36	4 $\frac{1}{2}$ $\times$ 3 $\times$ .32	6 $\times$ 3 $\times$ .32	6 $\times$ 3 $\times$ .34	7 $\times$ 3 $\times$ .33	7 $\times$ 3 $\times$ .45	8 $\times$ 3 $\times$ .42
40	4 $\frac{1}{2}$ $\times$ 3 $\times$ .34	6 $\times$ 3 $\times$ .38	6 $\times$ 3 $\times$ .35	7 $\times$ 3 $\times$ .36	8 $\times$ 3 $\times$ .37	9 $\times$ 3 $\frac{1}{2}$ $\times$ .38
44	5 $\times$ 3 $\times$ .32	6 $\times$ 3 $\times$ .40	7 $\times$ 3 $\times$ .33	8 $\times$ 3 $\times$ .35	8 $\times$ 3 $\times$ .42	9 $\times$ 3 $\frac{1}{2}$ $\times$ .38
48	5 $\times$ 3 $\times$ .36	5 $\frac{1}{2}$ $\times$ 3 $\times$ .32	7 $\times$ 3 $\times$ .33	8 $\times$ 3 $\times$ .35	8 $\times$ 3 $\frac{1}{2}$ $\times$ .46	9 $\times$ 3 $\frac{1}{2}$ $\times$ .45
52	6 $\times$ 3 $\times$ .32	5 $\frac{1}{2}$ $\times$ 3 $\times$ .37	7 $\times$ 3 $\times$ .36	8 $\times$ 3 $\times$ .37	9 $\times$ 3 $\frac{1}{2}$ $\times$ .38	10 $\times$ 3 $\frac{1}{2}$ $\times$ .40
56	6 $\times$ 3 $\times$ .32	6 $\times$ 3 $\times$ .34	7 $\times$ 3 $\times$ .36	8 $\times$ 3 $\times$ .42	9 $\times$ 3 $\frac{1}{2}$ $\times$ .38	10 $\times$ 3 $\frac{1}{2}$ $\times$ .40
60	6 $\times$ 3 $\times$ .32	6 $\times$ 3 $\times$ .35	8 $\times$ 3 $\times$ .35	8 $\times$ 3 $\frac{1}{2}$ $\times$ .46	9 $\times$ 3 $\frac{1}{2}$ $\times$ .51	10 $\times$ 3 $\frac{1}{2}$ $\times$ .50

- (1) The sizes of the stiffeners are specified in inches.  
 (2) Sizes for intermediate heights shall be determined by interpolation.  
 (3) Angles stiffeners of 6 inches in depth and all bulb angle stiffeners shall be connected to the inner bottom plating by a lug.  
 (4) The above stiffeners shall comply with the specifications set forth in British Standard Specifications 4A—1934 and 6—1924 applicable to stiffeners of the scantlings and type indicated.

TABLE 1A

(paragraphs 8 and 10 of this Schedule)

## THICKNESSES OF BULKHEAD AND TUNNEL PLATING

Plating of Collision Bulkhead:  
 Stiffeners spaced 24 inches apart.  
 Plating of Bulkheads (other than the Collision Bulkhead) and Flat Plating of Tunnels:  
 Stiffeners spaced 30 inches apart  
 Curved Plating of Tunnels:  
 Stiffeners spaced 36 inches apart

Plating of Bulkheads (other than the Collision Bulkhead) and Flat Plating of Tunnels:  
 Stiffeners spaced 36 inches apart

Depth at Middle Line from Bulkhead Deck to Lower Edge of Plate in feet		Thickness in inches	Depth at Middle Line from Bulkhead Deck to Lower Edge of Plate in feet		Thickness in inches
Above	Not above		Above	Not above	
—	7	.18	—	8	.22
7	9	.20	8	10	.24
9	11	.22	10	12	.26
11	14	.24	12	14	.28
14	16.5	.26	14	16	.30
16.5	19	.28	16	18	.32
19	22	.30	18	21	.34
22	25	.32	21	23	.36
—	—	—	23	26	.38
25	28	.34	26	29	.40
28	31	.36	29	31.5	.42

If the stiffeners are spaced otherwise than is specified above, the thicknesses of the plating shall be such as will result in a strength equivalent to that resulting from the thicknesses and spacings specified above.

TABLE 2A

(paragraphs 8 and 10 of this Schedule)

SIZES OF BULKHEAD STIFFENERS SPACED 30 INCHES APART AND FITTED WITH BRACKET END CONNECTIONS AT TOP AND BOTTOM IN ACCORDANCE WITH TABLE 4

Overall Length of Stiffener, including End Connections, in feet	Height of Bulkhead Deck above Top of Stiffener, in feet									
	0	2	4	6	8	10	12	14	16	18
6					4×2½×·25	4×2½×·26	4×3×·30	4×3×·34	4×3×·30	4×3×·32
7					4½×2½×·28	4½×3×·30	4½×3×·32	5×3×·30	5×3×·34	5×3×·36
8	3×2½×·24	3½×2½×·26	4×2½×·28	4½×3×·30	5×3×·30	6×3×·32	6×3×·32	6×3×·32	5×2½×·34	5×23×·34
9	3½×2½×·26	4×2½×·28	4½×3×·30	5×3×·30	6×3×·32	6×3×·32	5×2½×·34	5×2½×·35	53×3×·32	5½×3×·44
10	4×2½×·28	4½×3×·30	5×3×·32	6×3×·32	5×2½×·34	5×2½×·36	5½×3×·34	5½×3×·37	6×3×·34	6×3×·35
11	4½×3×·30	5×3×·32	6×3×·32	5×2½×·34	5½×3×·34	5½×3×·34	6×3×·34	7×3×·33	7×3×·33	7×3×·36
12	5×3×·32	6×3×·32	5×2½×·34	5½×3×·32	6×3×·34	6×3×·35	7×3×·33	7×3×·36	7×3×·36	8×3×·35
13	6×3×·32	5×2½×·34	5½×3×·32	6×3×·34	7×3×·33	7×3×·33	7×3×·36	8×3×·35	8×3×·35	
14	5×2½×·34	5½×3×·32	6×3×·34	7×3×·33	7×3×·36	7×3×·38	8×3×·35	8×3×·37	8×3×·37	
15	5½×3×·32	6×3×·34	7×3×·33	7×3×·36	7×3×·40	8×3×·35	8×3×·37	8×3½×·46		
16	6×3×·34	7×3×·33	7×3×·36	8×3×·35	8×3×·37	8×3×·37	8×3×·46	9×3½×·38		
17	7×3×·33	7×3×·36	8×3×·35	8×3×·37	8×3½×·46	9×3½×·38	9×3½×·38			
18	7×3×·36	8×3×·35	8×3×·37	8×3½×·46	9×3½×·38	9×3½×·38	9×3½×·51			
19	8×3×·35	8×3×·37	8×3½×·46	9×3½×·38	9×3½×·40	9×3½×·51				
20	8×3×·37	8×3½×·46	9×3½×·38	9×3½×·40	9×3½×·51	10×3½×·40				

(1) The sizes of stiffeners are specified in inches.

(2) Sizes for intermediate lengths of stiffeners and heights of bulkhead deck shall be determined by interpolation.

(3) The above stiffeners shall comply with the specifications set forth in British Standard Specifications 46—1934 and 6—1924 applicable to stiffeners of the scantlings and type indicated.

TABLE 3A

(paragraphs 8 and 10 of this Schedule)

SIZES OF BULKHEAD STIFFENERS SPACED 30 INCHES APART AND FITTED WITH LUG END CONNECTIONS AT TOP AND BOTTOM IN ACCORDANCE WITH  
TABLE 4

Over Length of Stiffener, including End Connections, in feet	Height of Bulkhead Deck above Top of Stiffener, in feet									
	0	2	4	6	8	10	12	14	16	18
8					6×3×·32	6×3×·38	5½×3×·32	5½×3×·35	6×3×·34	6×3×·35
9		5×3×·32	6×3×·32	6×3×·36	5½×3×·32	5½×3×·37	6×3×·34	7×3×·33	7×3×·33	7×3×·36
10	5×3×·30	6×3×·32	6×3×·38	5½×3×·34	6×3½×·35	7×3×·33	7×3×·33	7×3×·36	7×3×·41	8×3×·35
11	6×3×·32	5½×3×·32	5½×3×·38	6×3½×·35	7×3×·33	7×3×·36	7×3×·41	8×3×·35	8×3×·37	8×3×·42
12	6×3×·36	6×3×·34	6×3×·39	7×3×·33	7×3×·40	8×3×·35	8×3×·35	8×3×·42	9×3½×·36	9×3½×·38
13	6×3×·34	7×3×·33	7×3×·33	7×3×·41	8×3×·35	8×3×·40	8×3½×·46	9×3½×·38	9×3½×·44	
14	7×3×·33	7×3×·33	8×3×·35	8×3×·37	8×3½×·46	9×3½×·38	9×3½×·40	9×3½×·51	10×3½×·40	
15	7×3×·33	8×3×·35	8×3×·37	8×3½×·46	9×3½×·38	9×3½×·51	10×3½×·40	10×3½×·42		
16	7×3×·40	8×3×·37	8×3½×·46	9×3½×·38	9×3½×·51	10×3½×·40	10×3½×·50	11×3½×·43		
17	8×3×·35	8×3½×·46	9×3½×·38	9×3½×·51	10×3½×·40	11×3½×·43	11×3½×·43			
18	8×3½×·46	9×3½×·38	9×3½×·51	10×3½×·42	11×3½×·43	11×3½×·45	12×3½×·38			
19	9×3½×·38	9×3½×·51	10×3½×·42	11×3½×·43	11×3½×·48	12×3½×·38				
20	9×3½×·51	10×3½×·42	11×3½×·43	11×3½×·48	12×3½×·38	12×3½×·38				

Channels

- (1) The sizes of stiffeners are specified in inches.
- (2) Sizes for intermediate lengths of stiffeners and heights of bulkhead deck shall be determined by interpolation.
- (3) In the case of Channel Sections the lower thickness in that of the web and the upper thickness that of the flange.
- (4) The above stiffeners shall comply with the specifications set forth in British Standard Specifications Numbers 4A—1934, 6—1924 and 4—1932 applicable to stiffeners of the scantling and type indicated.

## SIZES OF BULKHEAD STIFFENERS SPACED 30 INCHES APART NOT FITTED WITH BRACKETS OR LUG END CONNECTIONS

Overall Length of Stiffener, including End Connections in feet	Height of Bulkhead Deck above Top of Stiffener, in feet									
	0	2	4	6	8	10	12	14	16	18
Angles	6	$3 \times 2\frac{1}{2} \times .23$	$3\frac{1}{2} \times 2\frac{1}{2} \times .26$	$4 \times 2\frac{1}{2} \times .28$	$4 \times 3 \times .32$	$4\frac{1}{2} \times 3 \times .32$	$5 \times 3 \times .32$	$6 \times 3 \times .32$	$6 \times 3 \times .34$	$6 \times 3 \times .38$
	7	$3\frac{1}{2} \times 2\frac{1}{2} \times .25$	$4 \times 2\frac{1}{2} \times .28$	$4\frac{1}{2} \times 3 \times .30$	$5 \times 3 \times .32$	$6 \times 3 \times .32$	$.6 \times 3 \times .3$	$6 \times 3 \times .38$	$5\frac{1}{2} \times 3 \times .32$	$5\frac{1}{2} \times 3 \times .34$
	8	$4 \times 2\frac{1}{2} \times .25$	$4\frac{1}{2} \times 3 \times .30$	$5 \times 3 \times .34$	$6 \times 3 \times .32$	$6 \times 3 \times .38$	$5\frac{1}{2} \times 3 \times .32$	$6 \times 3 \times .34$	$6 \times 3 \times .35$	$7 \times 3 \times .33$
	9	$4\frac{1}{2} \times 3 \times .30$	$6 \times 3 \times .32$	$6 \times 3 \times .34$	$5\frac{1}{2} \times 3 \times .32$	$6 \times 3 \times .34$	$6 \times 3 \times .35$	$7 \times 3 \times .33$	$7 \times 3 \times .36$	$7 \times 3 \times .38$
	10	$6 \times 3 \times .32$	$6 \times 3 \times .34$	$5\frac{1}{2} \times 3 \times .32$	$6 \times 3 \times .34$				$8 \times 3 \times .35$	$8 \times 3 \times .37$
	11	$6 \times 3 \times .32$	$5\frac{1}{2} \times 3 \times .32$	$6 \times 3 \times .35$	$7 \times 3 \times .33$	$7 \times 3 \times .36$	$7 \times 3 \times .38$	$8 \times 3 \times .35$	$8 \times 3 \times .40$	$9 \times 3\frac{1}{2} \times .38$
	12	$5\frac{1}{2} \times 3 \times .32$	$6 \times 3 \times .35$	$7 \times 3 \times .33$	$7 \times 3 \times .40$	$8 \times 3 \times .35$	$8 \times 3 \times .37$	$8 \times 3 \times .40$	$9 \times 3 \times .38$	$9 \times 3\frac{1}{2} \times .51$
	13	$6 \times 3 \times .34$	$7 \times 3 \times .33$	$7 \times 3 \times .40$	$8 \times 3 \times .35$	$8 \times 3 \times .42$	$9 \times 3\frac{1}{2} \times .38$	$9 \times 3\frac{1}{2} \times .38$	$9 \times 3\frac{1}{2} \times .40$	$10 \times 3\frac{1}{2} \times .40$
	14	$7 \times 3 \times .33$	$7 \times 3 \times .40$	$8 \times 3 \times .37$	$8 \times 3\frac{1}{2} \times .46$	$9 \times 3\frac{1}{2} \times .38$	$9 \times 3\frac{1}{2} \times .45$	$10 \times 3\frac{1}{2} \times .40$	$10 \times 3\frac{1}{2} \times .50$	$12 \times 3\frac{1}{2} \times .50$
	15	$7 \times 3 \times .38$	$8 \times 3 \times .37$	$8 \times 3\frac{1}{2} \times .44$	$9 \times 3\frac{1}{2} \times .38$	$9 \times 3\frac{1}{2} \times .51$	$10 \times 3\frac{1}{2} \times .50$	$10 \times 3\frac{1}{2} \times .50$	$11 \times 3\frac{1}{2} \times .43$	
Bulb Angles	16	$8 \times 3 \times .35$	$8 \times 3\frac{1}{2} \times .46$	$9 \times 3\frac{1}{2} \times .38$	$9 \times 3\frac{1}{2} \times .51$	$10 \times 3\frac{1}{2} \times .40$	$11 \times 3\frac{1}{2} \times .43$	$11 \times 3\frac{1}{2} \times .50$	$11 \times 3\frac{1}{2} \times .52$	
	17	$8 \times 3 \times .42$	$9 \times 3\frac{1}{2} \times .38$	$9 \times 3\frac{1}{2} \times .51$	$10 \times 3\frac{1}{2} \times .45$	$11 \times 3\frac{1}{2} \times .43$	$11 \times 3\frac{1}{2} \times .50$	$11 \times 3\frac{1}{2} \times .56$		
	18	$9 \times 3\frac{1}{2} \times .38$	$9 \times 3\frac{1}{2} \times .51$	$10 \times 3\frac{1}{2} \times .45$	$11 \times 3\frac{1}{2} \times .43$	$11 \times 3\frac{1}{2} \times .50$	$12 \times 3\frac{1}{2} \times .38$	$12 \times 3\frac{1}{2} \times .44$		
	19	$9 \times 3\frac{1}{2} \times .51$	$10 \times 3\frac{1}{2} \times .42$	$11 \times 3\frac{1}{2} \times .43$	$11 \times 3\frac{1}{2} \times .52$	$12 \times 3\frac{1}{2} \times .38$	$12 \times 3\frac{1}{2} \times .44$	$12 \times 3\frac{1}{2} \times .60$		
	20	$10 \times 3\frac{1}{2} \times .40$	$11 \times 3\frac{1}{2} \times .43$	$11 \times 3\frac{1}{2} \times .50$	$12 \times 3\frac{1}{2} \times .38$	$12 \times 3\frac{1}{2} \times .44$	$12 \times 4 \times 4 \times .48$	$12 \times 4 \times 4 \times .48$		

## Channels

- (1) The sizes of stiffeners specified in inches.
- (2) Sizes for intermediate lengths of stiffeners and heights of bulkhead deck shall be determined by interpolation.
- (3) The ends of the stiffeners shall be riveted to the bulkhead boundary angle.
- (4) In the case of Channel Sections the lower thickness is that of the web and the upper thickness that of the flange.
- (5) The above stiffeners shall comply with the specifications set forth in British Specifications Numbers 4A-1934, 6-1924 and 4-1932 applicable to stiffeners of the scantlings and type indicated.

TABLE 5A

(Paragraphs 8 and 10 of this Schedule)

## SIZES OF TUNNEL STIFFENERS SPACED 36 INCHES APART

Mean Height from Base of Tunnel to Bulkhead Deck in feet	Height from Base of Tunnel to Top of Flat Side in feet						
	3 feet 0 inches	3 feet 6 inches	4 feet 0 inches	4 feet 6 inches	5 feet 0 inches	5 feet 6 inches	6 feet 0 inches
Ages 8 ↑	2x $\times$ 2 $\frac{1}{2}$ $\times$ .20	2 $\frac{1}{2}$ $\times$ 2 $\frac{1}{2}$ $\times$ .24	3 $\times$ 2 $\frac{1}{2}$ $\times$ .23				
	2 $\frac{1}{2}$ $\times$ 2 $\frac{1}{2}$ $\times$ .24	3 $\times$ 2 $\frac{1}{2}$ $\times$ .26	3 $\frac{1}{2}$ $\times$ 2 $\frac{1}{2}$ $\times$ .25	4 $\times$ 2 $\frac{1}{2}$ $\times$ .25	4 $\times$ 2 $\frac{1}{2}$ $\times$ .28	4 $\times$ 3 $\times$ .30	
	3 $\times$ 2 $\frac{1}{2}$ $\times$ .24	3 $\frac{1}{2}$ $\times$ 2 $\frac{1}{2}$ $\times$ .26	4 $\times$ 2 $\frac{1}{2}$ $\times$ .26	4 $\times$ 3 $\times$ .32	4 $\frac{1}{2}$ $\times$ 3 $\times$ .32	5 $\times$ 3 $\times$ .32	5 $\times$ 3 $\times$ .38
	3 $\frac{1}{2}$ $\times$ 2 $\frac{1}{2}$ $\times$ .25	4 $\times$ 2 $\frac{1}{2}$ $\times$ .25	4 $\times$ 3 $\times$ .32	4 $\frac{1}{2}$ $\times$ 3 $\times$ .34	5 $\times$ 3 $\times$ .32	6 $\times$ 3 $\times$ .32	6 $\times$ 3 $\times$ .32
	3 $\frac{1}{2}$ $\times$ 2 $\frac{1}{2}$ $\times$ .30	4 $\times$ 3 $\times$ .30	4 $\times$ 3 $\times$ .32	5 $\frac{1}{2}$ $\times$ 3 $\times$ .32	6 $\times$ 3 $\times$ .32	6 $\times$ 3 $\times$ .32	6 $\times$ 3 $\times$ .44
	4 $\times$ 2 $\frac{1}{2}$ $\times$ .28	4 $\frac{1}{2}$ $\times$ 3 $\times$ .30	4 $\frac{1}{2}$ $\times$ 3 $\times$ .38	6 $\times$ 3 $\times$ .32	6 $\times$ 3 $\times$ .32	6 $\times$ 3 $\times$ .40	5 $\frac{1}{2}$ $\times$ 3 $\times$ .34 Bulb Angles

- (1) The sizes of the stiffeners are specified in inches.
- (2) Sizes for intermediate heights shall be determined by interpolation.
- (3) The ends of tunnel stiffeners shall be riveted to the tunnel boundary angles.
- (4) The above stiffeners shall comply with the specifications set forth in British Standards Specifications Numbers 4A-1934 and 6-1934 applicable to stiffeners of the scantlings and type indicated.

## FOURTH SCHEDULE

## Provision for Cinematograph Exhibitions

**1. Exits from Public Rooms.**—Any public room in which cinematograph exhibitions are intended to be given shall be provided with means of escape which are remote from the projector and are adequate having regard to the number of persons who may be in the audience. The doors by which such escape may be made shall be clearly marked with the word 'Exit' and shall be so constructed as easily to open outwards. The seating shall be arranged in rows for the exhibitions so as not to interfere with free access to such doors.

**2. Storage of Films.**—(1) There shall be provided in the ship:

- (a) a storage room bounded by 'A' class divisions; or
- (b) a locker constructed of material capable of resisting fire as efficiently as an 'A' class division, appropriated solely for the storage of cinematograph films intended to be exhibited in the ship. Such storage room or locker, as the case may be, shall, whenever practicable, be situated on an upper deck and in a position remote from passenger spaces. It shall be provided with an outlet to the open air with an area of not less than one square inch for each 5 pounds weight of film that may be stored in the room or locker.

(2) A metal spool box, with means of closure which will prevent the passage of flame into the box, shall be provided for the storage and projection of each spool of film, and shall be capable of being attached to and removed from the projector without being opened. Metal containers with self-closing lids shall be provided in sufficient number for the storage of the spool boxes.

**3. Projector Rooms and Cabinets.**—(1) If the ship is provided with a film projector intended for giving cinematograph exhibitions in a public room therein, not being a portable projector, there shall be provided in the ship:

- (a) a permanent projector room, which shall be bounded by 'A' class divisions, and to which access shall be obtained from a space in which the audience are not accommodated, and shall, whenever practicable, be from the open air, or
- (b) a fixed or portable projector cabinet made wholly of, or lined with, incombustible material. In the following sub-paragraphs of this paragraph the expression 'projector room' shall be deemed to include a projector cabinet.

(2) All fittings in the projector room shall be made wholly of, or lined with, incombustible material. The projector room shall be large enough to enable the projector to be properly operated.

(3) Every entrance to a projector room shall be provided with a self-closing door which shall open outwards and shall be well-fitting and as effective in resisting fire as the structure in which it is fitted.

(4) There shall not be provided more than two openings in the structure of the projector room for each projector in the room, whether for the projection of light or the observation of the screen. The openings shall be no larger than is required for such purposes and shall be glazed with stout plate glass.

(5) Means shall be provided which will ensure an adequate supply of fresh air within the projector room. The ventilation openings shall be covered with wire netting of mesh not less than 16 per square inch. The ventilation shall, wherever practicable, be to the open air.

(6) The openings in the projector room for projection, observation and ventilation purposes shall be fitted with close-fitting self-closing shutters capable of being simultaneously released. Means for releasing the shutters shall be provided both inside and outside the projector room. All openings through which cables pass into the projector room shall be sealed in a manner which will prevent the passage of smoke. The projector room and the doors and shutters thereof shall be so constructed that when the doors and shutters are closed the passage of smoke from the projector room will be prevented.

(7) Separate electrical circuits shall be provided for the illuminant of the projector and for the lighting of the projector room. The supply of electrical energy for the illuminant of the projector shall be capable of being controlled by two switches situated respectively inside the projector room and outside the

projector room at a position sufficiently distant therefrom to enable the switch to be safely operated despite a fire in the projector room.

(8) Devices shall be provided which will prevent the films from coming into contact with any electric lamp, terminal or other electrical fitting within the projector room. All switches and fuses in the projector room shall be completely protected, and all resistances in that room shall be of a design which will prevent overheating.

**4. Projectors.**—Every projector, not being a portable projector, provided in the ship and intended for giving cinematograph exhibitions in a public room therein shall be firmly fixed in position and shall rest upon supports constructed of incombustible material. The projector shall be fitted with a metal shutter which can be readily inserted by hand between the projector lamp and the film-gate, and with a second shutter so arranged as automatically to cut off the film-gate from the illuminant when the projector stops. The film-gate shall be of substantial construction and shall afford sufficient heating surface to dissipate the heat which may be engendered by the illuminant. The opening for the film shall be sufficiently narrow to prevent flames travelling upwards or downwards from the light-opening.

**5. Exhibitions on Deck.**—If the ship is provided with a projector, not being a portable projector, intended for giving cinematograph exhibitions on an open deck, and the illuminant of such projector is not hermetically sealed in a glass bulb, the provisions of paragraphs 3 and 4 of this Schedule shall apply to the ship and to the projector as they apply in the case of a ship provided with a projector, not being a portable projector, intended for giving cinematograph exhibitions in a public room.

**6. Portable Projectors.**—(1) Portable projectors and the illuminant thereof shall be enclosed in casing constructed of incombustible material. There shall be no openings in such casing other than those necessary for the proper operation of the projector and for ventilation of the projector casing.

(2) Spool boxes for use with portable projectors shall be so designed that they cannot contain a reel exceeding 10 inches in diameter.

(3) The electric lamp provided as the illuminant for a portable projector shall be hermetically sealed in a glass bulb and shall not exceed 1,000 watts in power.

(4) Every portable projector shall be provided with a filter or other device which shall be permanently attached thereto and shall be capable of intercepting the heat in the light rays emitted by the illuminant so as to prevent the ignition of a stationery inflammable film if the film is exposed to the rays for a period of three minutes.

**7. Illuminant for Projectors.**—The illuminant provided for a projector shall be an electric lamp.

**8. "No Smoking Notices".**—(1) Legible notices prohibiting smoking within 3 feet of the projector or of the projector room or cabinet, as the case may be, shall be provided for display to the audience.

(2) Legible notices prohibiting smoking shall be provided for display in the projector room or cabinet, as the case may be, the re-winding room, if any, and the film storage room.

## FIFTH SCHEDULE

### Automatic Sprinkler, Fire Alarm and Fire Detection System

**1. Type and Charging of System.**—The automatic sprinkler and fire alarm and detection system shall be of the wet type with overhead sprinklers, and shall at all times be fully charged.

**2. Details of the System.**—The system shall comply with the following requirements:—

#### (a) Pressure tank:

(i) A pressure tank of adequate strength and construction having regard to the charge of water specified in this sub-paragraph shall be provided and shall have a capacity of not less than twice the standing charge of fresh water required for the automatic operation of the system. A standing charge of not less than 500 gallons of fresh water shall be

capable of being maintained in the pressure tank under an air pressure of not less than 70 lbs. per square inch plus the pressure due to a head of water measured from the bottom of the tank to the highest sprinkler in the system.

- (ii) The pressure tank shall be fitted with an efficient relief valve and with a water gauge glass and a pressure gauge. Stop valves or cocks shall be provided at each of the gauge connections.

(b) *Air Compressor:*

The pressure tank shall be connected to an air compressor capable of maintaining in the tank the pressure required by sub-paragraph (a) of this paragraph.

(c) *Pipes:*

- (i) The pipes forming part of the system shall be made of steel of adequate strength having regard to the pressure to which they may be subjected, and shall be properly joined and supported.
- (ii) Connections shall be provided which will supply a replenishment of the standing fresh water charge in the pressure tank, and which will enable the pipes to be flushed with fresh water after the use of salt water in the system.
- (iii) Any pipes which may be affected by frost shall be insulated so as to prevent the water therein from freezing.

(d) *External Connections:*

The sprinkler system shall be a self-contained unit, and no external connections shall be fitted to it other than the following:—

- (i) Hose couplings with shut-off valves, and non-return valves situated close to the couplings, for the purpose of coupling to a shore supply.
- (ii) A connection with the ship's fire main, provided with a shut-off screw-down non-return valve at the connection which will prevent a back flow from the sprinkler system to the fire main. Shut-off valves for the shore supply and the ship's fire main connection shall be clearly and permanently marked to show their purpose and shall be capable of being locked in the closed position.

(e) *Pump:*

- (i) An independent power pump shall be provided solely for the purpose of continuing automatically the discharge of water from the sprinkler heads. The pump shall be brought into action automatically by the pressure drop in the system before the standing fresh water charge in the pressure tank is completely exhausted.
- (ii) The pump shall have a suction direct from the sea which shall be independent of any other suction. The pump shall have fitted close to it on the delivery side a 2 inch diameter waste valve with a short open-ended discharge pipe for testing purposes.
- (iii) The arrangements shall be such as will prevent the pump from passing sea water into the pressure tank.
- (iv) The pump shall be capable of maintaining a pressure of 25 lbs. per square inch at the level of the highest sprinkler with the 2 inch diameter waste valve fully open.

(f) *Sprinkler Heads:*

- (i) Sprinkler heads shall be grouped into separate sections, each of which contains not more than 150 sprinkler heads. A section of sprinkler heads shall not serve more than two decks, and shall not be in more than one main vertical zone or in more than one watertight compartments: Provided that, in any ship, a section of sprinkler heads may serve more than two decks or be in more than one main vertical zone if the Central Government is satisfied that the protection of the ship against fire is thereby improved.
- (ii) Each section of sprinkler heads shall be controlled by one control valve, and no other valves shall be provided for controlling any of the sprinklers in that section. The control valves shall be readily accessible, and their locations shall be clearly and permanently indicated.

Means shall be provided to prevent the operation of the control valves by any person not authorised to do so by the Master of the ship.

- (iii) A pressure gauge shall be provided at each control valve and at a central station to indicate the pressure of water available throughout the system.
- (iv) The sprinkler heads shall be capable of operating with salt water and shall come into operation at a temperature of not less than 155°F. (68°C). They shall come into operation at a temperature of not more than 200°F. (93°C), except in drying rooms and similar spaces.
- (v) Each sprinkler head shall be capable of discharging water at a rate of not less than 20 gallons of water per minute under a supply pressure of 25 lbs. per square inch.
- (vi) At least six spare sprinkler heads shall be provided for each section. They shall be stowed in boxes or holders provided for that purpose near the control valve for the section, and the boxes or holders shall be clearly and permanently marked to show their contents.

*(g) Spacing of Sprinkler Heads:*

Sprinkler heads shall be spaced not more than 13 feet apart and not more than 8 feet 6 inches from a bulkhead. They shall be placed as clear as may be of beams or other objects likely to obstruct the projection of water and in such positions that all combustible material in the space concerned will be well sprayed.

*(h) Automatic Alarm:*

The sprinkler system shall include means for giving a visible and audible alarm signal automatically whenever any sprinkler comes into operation. The alarm signal shall indicate at one or more points in the ship, so as to come rapidly to the attention of the master and crew of the ship, the presence and position of any fire in the spaces served by the system. If such alarm is operated by electricity it shall be constructed so as to operate if any derangement occurs in the electrical circuit.

*(i) Power Supply:*

There shall be provided not less than two sources of power to operate the independent pump, air compressor and automatic alarm.

*(j) Provisions for Testing:*

- (i) A test valve shall be provided for testing the automatic alarm for each section of sprinklers by a discharge of water equivalent to the operation of one sprinkler head. The test valve for each section shall be situated near the control valve for that section.
- (ii) Means shall be provided for testing the automatic cutting in of the pump.
- (iii) Switches shall be provided at one of the points referred to in subparagraph (h) of this paragraph which will enable the alarm and the indicators for each section of sprinklers to be tested.

#### SIXTH SCHEDULE

*(See Rules 4 and 17)*

1. (1) For steamships of which gross tonnage;

	<i>Rupees</i>
does not exceed 100 tons	190
exceeds 100 tons but does not exceed 300 tons	300
exceeds 300 tons but does not exceed 600 tons	360
exceeds 600 tons but does not exceed 900 tons	440
exceeds 900 tons but does not exceed 1,200 tons	510
exceeds 1,200 tons but does not exceed 1,500 tons	590

and for every additional 300 tons or fraction of 300 tons in excess of 1,500 tons

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(2) If the ship's hull, machinery, or equipments are stated in the Declaration of Survey to be sufficient only for a period of less than one year from the date

thereof, one-twelfth of the fee payable under paragraph (1) shall be payable for each month or fraction of a month comprised in the said period:

Provided that:

- (a) the minimum fee shall be one-fourth of the annual fee;
- (b) the full annual fee shall be payable, whatever be the nature of certificate—

- (i) in the case of a steamship coming under survey for the first time, or
- (ii) if, in accordance with the application for a survey, a steamship has been fully surveyed, but the owner or master of the steamship is, for any reason, unwilling or unable to execute the repairs recommended by the Surveyor, or
- (iii) if the survey is completed with the exception of minor details.

(3) The fees specified in sub-paragraphs (1) and (2) shall be deemed to cover all the visits which a Surveyor may have to make before granting a Declaration of Survey.

(4) Where vessels are surveyed on the running survey basis, an additional fee equivalent to one-fourth of the fee as may be payable in respect of the survey under these Rules, shall be paid.

**2. Overtime Fees.**—The charge of overtime fees in respect of surveys or inspections wholly or partially carried out between hours of 5 P.M. and 7 A.M. shall be regulated as follows:—

- (a) Where on the application of the owner or master of a steamship a Surveyor is called upon to undertake the survey or inspection of a vessel after 5 P.M. and before 7 A.M. an additional fee of Rs. 75 shall be charged.
- (b) Where a Surveyor is detained at the request of the owner or master of a steamship after 5 P.M. to complete the survey undertaken between the hours of 7 A.M. and 5 P.M. an additional fee of Rs. 40 shall be charged if the Surveyor is released from duty before 6 P.M. and Rs. 75 if he is detained later than 6 P.M.
- (c) Where the owner or master of a steamship has asked for survey between the hours of 7 A.M. and 5 P.M. but official arrangements have not allowed of the work being done between these hours, no additional fees shall be chargeable.
- (d) Where a Surveyor has been called upon as specified upon in clause (a) or detained as specified in clause (b) of this paragraph, the owner or master of the steamship shall give information of the fact in writing to the Principal Officer, Mercantile Marine Department of the Port stating the hours during which the Surveyor was in attendance.

[No. F.43-MA(2)/54.]

**S.R.O. 331.**—In exercise of the powers conferred by section 145A of the Indian Merchant Shipping Act, 1923 (21 of 1923), the Central Government hereby makes the following Rules, the same having been previously published as required by sub-section (1) of the said section, namely:—

**1. Short title, commencement and application.**—(1) These rules may be called the Indian Merchant Shipping (Closing of Openings in Hulls and in Watertight Bulkheads) Rules, 1956.

(2) They shall come into force on the 1st February, 1957.

(3) The rules shall apply to every ship for which a certificate of survey is required under Part III of the Indian Merchant Shipping Act, 1923 (21 of 1923).

**2. Definitions.**—(1) In these rules, unless the context otherwise requires—

- (a) "breadth of the ship" means the greatest moulded breadth at or below the ship's deepest sub-division load water line;
- (b) "bulkhead deck" means the uppermost deck upto which transverse watertight bulkheads are carried;
- (c) "margin line" means a line drawn at least three inches below the upper surface of the bulkhead deck at the side of a ship, and assumed for the purpose of determining the floodable length of the ship.

(2) For the purposes of these rules a ship shall be deemed to 'proceed to sea' when she leaves a mooring or anchorage at a port for that purpose and to be at sea until she has been secured at a mooring or anchorage at a port.

**3. Closing of contrivances.**—(1) In every ship to which these Rules apply, the contrivances mentioned in sub-rule (2) shall immediately before the ship proceeds to sea, be securely closed, and shall be kept so closed while the ship is at sea.

(2) The contrivances referred to in sub-rule (1) are as follows:—

- (a) hinged watertight doors below the margin line which are fitted in bulkheads required by the Indian Merchant Shipping (Construction and Survey of Passenger Steamers) Rules, 1956, to be watertight and which divide cargo between deck spaces;
- (b) all sidescuttles which can be opened and which are situated in any between decks and below the margin line, if any of such sidescuttles have their sills below a line drawn parallel to the bulkhead deck at the side of the ship and having its lowest point  $4\frac{1}{2}$  ft. in addition to  $2\frac{1}{2}$  per cent. of the breadth of the ship above the water when the ship is first afloat in sea water after proceeding to sea: Provided that in fair weather in tropical zones within the meaning of the Indian Merchant Shipping (Load Line) Rules, 1934 (including seasonal tropical zones in the appropriate seasons), this clause shall have effect as if the figures and word "3 $\frac{1}{2}$  ft." were substituted for the figures and word " $4\frac{1}{2}$  ft.";
- (c) sidescuttles below the margin line which will not be accessible while the ship is at sea, together with their deadlights;
- (d) sidescuttles below the margin line situated in spaces appropriated alternatively for the carriage of cargo or passengers, together with their deadlights, when the space in which they are situated is used for the carriage of cargo;
- (e) gangway, cargo and coaling ports below the margin line.

(3) For the purposes of this rule, a contrivance shall be deemed to be below the margin line if the sill of the contrivance is below that line and a sidescuttle shall not be deemed to be closed unless it is locked.

**4. Closing of doors.**—In every ship to which these rules apply, every watertight door, not being a door referred to in clause (a) of sub-rule (2) of rule 3, shall be kept closed while the ship is at sea except when it is required to be open for the working of the ship. When open, every such door shall be kept free from obstructions which might prevent its rapid closure.

**5. Portable plates.**—In every ship to which these rules apply, every portable plate closing an opening in any portion of the internal structure of the ship, which is required by the Indian Merchant Shipping (Construction and Survey of Passengers Steamers) Rules, 1956, to be watertight, being an opening which is wholly or partly below the margin line, shall be in place when the ship proceeds to sea and shall be kept in place while the ship is at sea, except in case of urgent necessity. In replacing any such plate all reasonable precautions shall be taken to ensure that the joints are watertight.

**6. Contrivances not in use to be closed.**—In every ship to which these rules apply the cover and valve of any ash-shoot, rubbish-shoot or other similar contrivance having its inboard opening below the margin line shall be kept securely closed when the device is not in use.

**7. Drill.**—(1) In every ship to which these rules apply, all watertight doors and other contrivances referred to in rules 3, 4 and 6 shall be opened and closed for purposes of drill—

- (a) at intervals of not more than seven days; and
- (b) immediately before the ship proceeds to sea, if the ship is intended to remain at sea for a period of more than seven days:

Provided that nothing in this sub-rule shall be taken to authorise the opening, while the ship is at sea, of any watertight door or other contrivance which is required by rule 3 to be kept closed.

(2) In every ship to which these rules apply, all watertight doors fitted in transverse bulkheads required by the Indian Merchant Shipping (Construction

and Survey of Passenger Steamers) Rules, 1956, to be watertight (not being doors required by these rules to be kept closed when the ship is at sea), shall be opened and closed for the purposes of drill once in every period of twenty-four hours when the ship is at sea, if such doors are both—

- (a) hinged, or operated by power; and
- (b) required to be open for the working of the ship at any time while the ship is at sea:

Provided that nothing in this sub-rule shall require any bunker door to be opened and closed during any voyage before it has been opened for the working of the ship during that voyage.

**8. Inspection.**—In every ship to which these rules apply—

- (a) all watertight doors,
- (b) all mechanisms, indicators and warning devices connected with such doors,
- (c) all valves the closing of which is necessary to make watertight any compartment below the margin line, and
- (d) all valves the operation of which is necessary for the efficient operation of damage-control cross-connections.

shall be inspected at intervals of not more than seven days by a person appointed for that purpose by the Master of the ship.

**9. Entries in Log-book.**—In every ship to which these rules apply, entries shall be made in the official log-book recording the following:—

- (a) the time of the last closing, before the ship proceeds to sea, of the watertight doors and other contrivances referred to in rule 3 and of the next subsequent opening of such doors and contrivances;
- (b) the times of the closing and opening while the ship is at sea, of any watertight door which is fitted between bunkers in the between decks below the bulkhead deck;
- (c) whether the portable plates referred to in rule 5 are in place when the ship proceeds to sea, and the times, if any, of the removal and replacement of such plates when the ship is at sea; and
- (d) the occasions on which drills are practised and inspections made in compliance with the foregoing provisions of these rules, and whether the contrivances to which such drills and inspections relate are in good working order.

**10. Penalty.**—Whoever does any act, in contravention of any of the provisions of these rules, shall be punishable with fine which may extend to two hundred rupees, and when the breach is a continuing breach with a further fine which may extend to twenty rupees for every day after the first during which the breach continues.

[No. 43-MA(1)/53.]

**S.R.O. 332.**—In exercise of the powers conferred by sub-section (1) of section 218A of the Indian Merchant Shipping Act, 1923 (21 of 1923), read with clauses (i), (k) and (m) of sub-section (1A) of that section, the Central Government hereby makes the following Rules, the same having been previously published as required by sub-section (1) of the said section, namely:—

**1. Short title, commencement and application.**—(1) These rules may be called the Indian Merchant Shipping (Musters) Rules, 1956.

(2) They shall come into force on the 1st February, 1957.

**2. Interpretation.**—In these rules, unless the context otherwise requires, the expression 'muster' includes a boat-drill and a fire-drill.

These rules apply to—

- (a) all Indian ships;
- (b) all other ships while they are within any port in India:

Provided that these rules shall not apply to a ship by reason of her being within a port in India if she would not have been in any such port but for stress of weather or any other circumstance that neither the master nor the owner nor the charterer (if any) of the ship could have prevented or forestalled.

**3. Classification of ships.**—For the purposes of these rules, the ships to which these rules apply shall be arranged in the same classes in which ships are arranged for the purposes of the Indian Merchant Shipping (Life Saving Appliances) Rules, 1956, and any reference in these rules to ship of any class shall be construed accordingly.

**4. Muster List.**—(1) The Master of every ship of Classes I, II, III, IV, V, VI, VIII and IX shall prepare a muster list showing in respect of each member of the crew the special duties which are allotted to him and the station to which he shall go in the event of an emergency, including duties and stations applicable for extinguishing fire.

(2) The muster list shall specify definite signals for calling all the crew to their boats and fire stations in an emergency, and for indicating when the ship is to be abandoned.

(3) The muster list shall assign duties to the different members of the crew in connection with—

- (a) the closing of the watertight doors, valves and closing mechanism of scuppers, ash shoots, and other parts;
- (b) the equipment of the boats and buoyant apparatus generally;
- (c) the launching of the boats attached to davits;
- (d) the general preparation of any other boats and buoyant apparatus;
- (e) the muster of the passengers (if any);
- (f) the extinction of fire.

(4) The duty of seeing that the boats and buoyant apparatus and other-life-saving apparatus are at all times ready for use shall be assigned by the muster list to one or more officers.

(5) The muster list shall assign to the members of the stewards department their several duties in relation to the passengers at a time of emergency. These duties shall include—

- (a) warning the passengers;
- (b) seeing that they are suitably clad and have put on their lifejackets in a proper manner;
- (c) assembling the passengers at muster stations;
- (d) keeping order in the passages and on the stairways, and, generally controlling the movements of the passengers;
- (e) seeing that a supply of blankets is taken to the lifeboats.

(6) The muster list shall be prepared after the Articles of Agreement have been opened with the crew. The list shall be drawn up before the ship proceeds to sea, and shall be dated and signed by the Master.

(7) If, after the muster list has been prepared any change takes place in the crew which necessitates an alteration in the muster list, the Master shall either revise the list or prepare a new list.

(8) Copies of the muster list shall be posted in several parts of the ship, and in particular in the crew's quarters, before the ship proceeds to sea and shall be kept so posted while the ship is at sea.

**5. Emergency signal for passengers.**—(1) Assembly stations for all passengers shall be appointed for the event of an emergency and the position of those stations and the meaning of all signals affecting passengers shall be clearly stated in Hindi, English and such other languages as are appropriate, on cards pasted in their cabins and in conspicuous places in other passenger quarters. Particular attention shall be paid to the pasting of these cards in spaces used by unberthed passengers.

(2) The emergency signal for summoning passengers to the assembly stations shall be a succession of more than six short blasts followed by one long blast on the whistle or siren.

**6. Wearing of Lifejackets.**—Printed illustrations showing the correct method of wearing a lifejacket shall be pasted on cards and exhibited in conspicuous places in each passenger accommodation.

The illustrations shall also have detailed explanations in Hindi, English and such other languages as are appropriate, showing step by step the process of putting on a lifejacket.

**7. Training.**—(1) In ships of Classes I, II, III, IV and V musters of crew shall be held before the ship leaves her final port of departure in India and, in addition, in ships of Classes I and III musters of the passengers shall be held within twenty-four hours after leaving such port.

(2) In ships of Class VI a muster of the crew shall take place at intervals of not more than seven days, when practicable to ensure that the crew understand and are drilled in the duties assigned to them for the event of an emergency.

(3) In ships of Classes VIII and IX musters of the crew shall take place at intervals of not more than fourteen days to ensure that the crew understand and are drilled in the duties assigned to them for the event of an emergency.

(4) In ships of Classes VII, X, XI and XII the Master shall take steps to ensure that the crew understand the uses of life-saving equipment and fire appliances carried on board and know where they are kept.

(5) Different groups of boats shall be used in turn at successive boat drills. The drills and inspection shall be so arranged that the crew thoroughly understand and are practised in the duties they have to perform, and that all life-saving appliances and fire appliances with the gear appertaining to them are always ready for immediate use.

**8. Penalty.**—Whoever does any act in contravention of the provisions of these rules shall be punishable with fine which may extend to two hundred rupees, and when the breach is a continuing breach with a further fine which may extend to twenty rupees for every day after the first during which the breach continues.

[No. 51-MA(2)/54.]

**S.R.O.333.**—In exercise of the powers conferred by sub-sections (1) and (2) of section 145-A, sub-section (1) of section 191 and sub-sections (1) and (1A) of section 216A of the Indian Merchant Shipping Act 1923, (21 of 1923), and in supersession of the Indian Merchant Shipping (Life Saving Appliances) Rules, 1934, the Central Government hereby makes the following rules, the same having been previously published as required by sub-section (1) of section 145A, sub-section (3) of section 191 and sub-section (1) of section 216A of the said Act, namely :—

## THE INDIAN MERCHANT SHIPPING (LIFE SAVING APPLIANCES) RULES, 1956

### PRELIMINARY

**1. Short title, commencement and extent.**—(1) These rules may be called the Indian Merchant Shipping (Life Saving Appliances) Rules, 1956.

(2) They shall come into force on the 1st February, 1957.

(3) The provisions of these rules relating to steamships shall apply equally to ships which are propelled by electricity or by any other mechanical power.

**2. Definitions.**—In these rules, unless there is anything repugnant in the subject or context :—

(1) "Act" means the Indian Merchant Shipping Act, 1923 (21 of 1923).

(2) "approved" means approved by the Central Government;

(3) "buoyant apparatus" means flotation equipment (other than lifebuoys and lifejackets) designed to support persons who are in the water;

(4) "class A motor lifeboat" means a lifeboat complying with the requirements of sub-rule (1) of rule 19 of these rules;

(5) "class B motor lifeboat" means a lifeboat complying with the requirements of sub-rule (2) of rule 19 of these rules.

(6) "Convention" means the International Convention for the Safety of Life at Sea, 1948;

(7) "international voyage" means a voyage from a country to which the Convention applies to a port outside such country, or *conversely*; and for this purpose every territory for the international relations of which a contracting Govern-

- ment is responsible or which the United Nations are the administering authority is regarded as a separate country ;
- (8) "length" relating to a ship means the registered length of the ship ;
  - (9) "mechanically propelled lifeboat" means a lifeboat (other than a motor lifeboat) complying with the requirements of rule 21 of these rules ;
  - (10) "mile" means a nautical mile of 6080 feet ;
  - (11) "person" means a person over the age of one year ;
  - (12) "Schedule" means a Schedule to these rules ;
  - (13) "Section" means a section of the Act ;
  - (14) "short international voyage" means an international voyage in the course of which a ship is not more than 200 miles from a port or place in which the passengers and crew could be placed in safety and which does not exceed 600 miles in length between the last port of call in the country in which the voyage begins and the final port of destination ;
  - (15) "surveyor" means a surveyor appointed under section 129 ; and
  - (16) "tanker" means a cargo ship constructed or adapted for the carriage in bulk of liquid cargoes of an inflammable nature ;

**3. Classification of Ships.**—For the purposes of these rules, ships shall be arranged in the following classes, namely :—

#### A.—Passenger Ships

*Class I.*—Passenger steamers, other than ships of Classes II, III, and IV engaged on international voyages ;

*Class II.*—Passenger steamers, other than ships of Classes IV and V engaged on short international voyages ;

*Class III.*—Unberthed passenger ships, being steamships, other than ships of Class IV, engaged on international voyages ;

*Class IV.*—Unberthed passenger ships, being steamships engaged on short international voyages ;

*Class V.*—Unberthed passenger ships, being steamships, other than ships of Classes I, II, III and IV, engaged on voyages between ports in India, or between any port in India and any port or place in the Island of Ceylon or *vice versa*.

*Class VI.*—Unberthed passenger ships, being steamships, other than ships of Class V engaged on voyages between ports situated in India or between any port in India and any port or place in the Island of Ceylon in the course of which they do not go more than 20 miles from the nearest land :

Provided that such ships shall not cease to be ships of Class VI merely by reason of the fact that they cross during their voyage the Gulf of Kutch, Cambay or Mannar ;

*Class VII.*—Sailing ships carrying more than 12 passengers which proceed to sea.

#### B.—Non-passenger Ships

*Class VIII.*—Foreign-going ships, being steamships other than passenger steamers ;

*Class IX.*—Home Trade ships, being steamships, other than passenger steamers ;

*Class X.*—Tugs, tenders, launches, lighters, dredgers, barges and hoppers which are employed within Home Trade limits and proceed to sea.

*Class XI.*—Fishing Boats ;

*Class XII.*—Sailing ships and auxiliary sailing vessels which proceed to sea and do not carry more than 12 passengers ;

*Class XIII.*—Pleasure yachts, other than passenger steamers, exceeding 15 tons net tonnage.

**4. Life Saving Appliances.**—(1) The lifeboats and buoyant apparatus in a ship shall be readily available in case of emergency.

(2) To ensure that they are readily available, all lifeboats and buoyant apparatus carried in compliance with these rules shall comply with the following conditions, namely :—

- (a) they must be capable of being put into the water safely and rapidly even under unfavourable conditions of list and trim ;

- (b) they shall be so constructed that it is possible to effect embarkation into the life-boats rapidly and in good order;
- (c) the arrangement of each lifeboat and article of buoyant apparatus must be such that it will not interfere with the operation of other boats and buoyant apparatus;
- (d) all life-saving appliances shall be kept in working order and available for immediate use before the ship leaves port and at all times during the voyage.

**5. Ships of Class I.**—(1) This rule applies to ships of Class I.

(2) Every ship of Class I shall, subject to the provisions of rule 43, be provided, in accordance with its length, with the number of sets of davits specified in Column A of the table set out in the First Schedule :

Provided that no ship shall be required to be fitted with a number of sets of davits greater than the number of lifeboats required to accommodate the total number of persons which the ship is certified to carry.

(3) A lifeboat shall be attached to every such set of davits.

(4) Every ship to which this rule applies shall carry two life-boats attached to davits—one or each side of the ship—for use in an emergency. These boats shall not be more than 26 feet in length. They may be counted as lifeboats for the purposes of sub-rule (5) of this rule if they comply with the requirements of these rules applying to lifeboats, except that in ships in which the requirements of sub-rule (8) of rule 31 are met by means of appliances fitted to the sides of the life-boats, such appliances shall not be required to be fitted to the two boats provided to meet the requirements of this rule.

(5) Where the lifeboats carried in compliance with the foregoing provisions of this rule do not accommodate the total number of persons which the ship is certified to carry, additional sets of davits with lifeboats attached shall be fitted as far as is practicable in the circumstances to make up the deficiency in such accommodation. If it is impracticable to fit such additional sets of davits, additional lifeboats, sufficient to make up such deficiency shall be carried under each or any of the lifeboats attached to davits. Such additional life-boats shall not, however, be carried under the two emergency boats carried in compliance with sub-rule (4).

(6) The lifeboats carried in compliance with this rule shall be not less than 24 feet in length.

(7) Where the number of lifeboats carried in compliance with this rule is 20 or more, two of such lifeboats shall be Class A motor lifeboats.

(8) Where the number of lifeboats carried in compliance with this rule is more than 13 but less than 20, one of such lifeboats shall be a Class A motor lifeboat and a second of such lifeboats shall be either a Class A motor lifeboat or a Class B motor lifeboat or a mechanically propelled lifeboat.

(9) Where the number of lifeboats carried in compliance with this rule is 13 or less, one of such lifeboats shall be a Class A motor lifeboat or a Class B motor lifeboat or a mechanically propelled lifeboat.

(10) Every Class A motor lifeboat carried in compliance with this rule shall be fitted with radiotelegraph equipment, a searchlight and other electrical equipment in each case complying with the requirements of rule 29.

(11) Where any ship to which this rule applies does not carry two Class A motor life-boats fitted with radiotelegraph equipment, a searchlight and other electrical equipment complying with the requirements of rule 29, it shall carry portable radiotelegraph equipment which shall comply with the requirements of rule 30.

(12) Every ship to which this rule applies shall carry approved buoyant apparatus sufficient to support 25 per cent of the total number of persons which the ship is certified to carry.

(13) Every ship to which this rule applies shall carry at least the number of approved lifebuoys determined in accordance with the following table, namely—

Length of ship in feet.	Minimum number of lifebuoys.
Not exceeding 200 . . . . .	8
Exceeding 200 but not exceeding 400 . . . . .	12
Exceeding 400 but not exceeding 600 . . . . .	18
Exceeding 600 but not exceeding 800 . . . . .	24
Exceeding 800 . . . . .	30

At least 50 per cent of the lifebuoys required by this rule, and in any case not less than six, shall be provided with self-igniting lights which cannot be extinguished in water.

(14) Every ship to which this rule applies shall carry one approved lifejacket for each person the ship is certified to carry.

(15) Every ship to which this rule applies shall carry an approved line-throwing appliance.

**6. Ships of Class II.**—(1) This rule applies to ships of Class II.

(2) Every ship to which this rule applies shall, subject to the provisions of rule 43, be fitted, in accordance with its length, with the number of sets of davits specified in Column A of the table set out in the First Schedule :

Provided that no ship shall be required to be fitted with a number of sets of davits greater than the number of lifeboats required to accommodate the total number of persons which the ship is certified to carry.

(3) A lifeboat of not less than 24 feet in length shall be attached to each set of davits and the lifeboats so attached shall together provide at least the capacity specified in column C of the table set out in the First Schedule to these rules.

(4) Every ship to which this rule applies shall carry two boats attached to davits—one on each side of these ship—for use in emergency. These boats shall not be more than 26 feet in length. They may be counted as lifeboats for the purpose sub-rule (3), if they comply with the requirements of these Rules applying to lifeboats, except that in ships in which the requirements of sub-rule (8) of rule 31 are met by means of appliances fitted to the sides of the lifeboats, such appliances shall not be required to be fitted to the two boats provided to meet the requirements of this rule.

(5) If in the opinion of the Central Government the volume of traffic so requires, the Central Government may permit any ship to which this rule applies, being a ship which is subdivided to the satisfaction of the Central Government, to carry persons in excess of the lifeboat capacity provided on board that ship in compliance with this rule :

Provided, however, that if such a ship is permitted by the Central Government to proceed to sea from a port in India on an international voyage exceeding 600 miles between the last port of call in India and the final port of destination, such ship shall carry lifeboats affording accommodation for 75 per cent of the persons on board.

(6) Subject to the provisions of sub-rule (5) where the lifeboats carried in compliance with sub-rule (3) will not accommodate the total number of persons which the ship is certified to carry, either additional lifeboats shall be carried under davits or approved buoyant apparatus shall be carried so that the total number of lifeboats together with such buoyant apparatus shall be sufficient for the total number of persons which the ship is certified to carry.

(7) Where the number of lifeboats carried in compliance with this rule is 20 or more, two of such lifeboats shall be Class A motor lifeboats.

(8) Where the number of lifeboats carried in compliance with this rule is more than 13 but less than 20, one of such lifeboats shall be a Class A motor lifeboat and the second shall be either a Class A motor lifeboat or a Class B motor lifeboat or a mechanically propelled lifeboat.

(9) Where the number of lifeboats carried in compliance with this rule is 13 or less, one of such lifeboats shall be a Class A motor lifeboat or a Class B motor lifeboat or a mechanically propelled lifeboat.

(10) Every Class A motor lifeboat carried in compliance with this rule shall be fitted with a radiotelegraph equipment, a searchlight and other electrical equipment, in each case complying with the requirements of rule 29.

(11) Every ship to which this rule applies which does not carry two Class A motor lifeboats fitted with a radiotelegraph equipment, a searchlight and other electrical equipment complying with the requirements of rule 29, shall carry portable radiotelegraph equipment which shall comply with the requirements of rule 30 :

Provided that in the case of any ship engaged on voyages of such duration that, in the opinion of the Central Government, portable radiotelegraph equipment is unnecessary, the Central Government may allow this apparatus to be dispensed with.

(12) Every ship to which this rule applies shall carry in addition to any buoyant apparatus carried in compliance with sub-rule (6) buoyant apparatus sufficient to support 10 per cent of the total number of persons which the ship is certified to carry.

(13) Every ship to which this rule applies shall carry at least the number of approved lifebuoys determined in accordance with the following table namely—

Length of ship in feet.	Minimum number of lifebuoys.
Under 200	8
200 and under 400	12
400 and under 600	18
600 and under 800	24
800 and Over	30

At least fifty per cent of the lifebuoys required by this rule and in any case not less than six shall be provided with self-igniting lights which cannot be extinguished in water.

(14) Every ship to which this rule applies shall carry one approved lifejacket for each person the ship is certified to carry.

(15) Every ship to which this rule applies shall carry an approved line-throwing appliance.

#### 7. Ships of Class III.—(1) This rule applies to ships of Class III.

(2) Every ship to which this rule applies shall, subject to the provisions of rule 43, be provided, in accordance with its length, with the number of sets of davits specified in column A of the table set out in the First Schedule :

Provided that no ship shall be required to have a number of sets of davits greater than the number of lifeboats required to accommodate the total number of persons which the ship is certified to carry.

(3) A lifeboat of not less than 24 feet in length shall be attached to each set of davits and the lifeboats so attached shall together provide at least the capacity specified in column C in the table set out in the First Schedule.

(4) Where the lifeboats carried in pursuance of sub-rule (3) do not provide sufficient accommodation for all persons on board, additional lifeboats attached to davits shall be carried to make up the deficiency. If it is impracticable to fit such additional sets of davits, additional lifeboats, sufficient to make up the said deficiency, shall be carried under each or any of the lifeboats attached to davits, but shall not be carried under the two emergency life-boats carried in compliance with sub-rule (7).

(5) If the lifeboats so provided in pursuance of sub-rules (3) and (4) do not provide accommodation for all persons on board, additional lifeboats under davits or approved buoyant apparatus shall be provided so that the total accommodation afforded by all the lifeboats together with the buoyant apparatus, shall be sufficient for the total number of persons which the ship is certified to carry.

(6) Every ship to which this rule applies shall carry in addition to any buoyant apparatus carried in compliance with sub-rule (5), approved buoyant apparatus sufficient to support 25 per cent of the total number of persons which the ship is certified to carry.

(7) Every ship to which this rule applies shall carry two boats attached to davits—one on each side of the ship—for use in an emergency. These boats shall not be more than 26 feet in length. They may be counted as lifeboats for the purposes of sub-rule (3) if they comply with the requirements of these rules applying to lifeboats, except that in ships in which the requirements of sub-rule (8) of rule 31 are met by means of appliances fitted to the sides of the lifeboats, such appliances shall not be required to be fitted to the two boats provided to meet the requirements of this rule.

(8) Where the number of lifeboats carried in compliance with this rule is 20 or more, two of such life-boats shall be Class A motor lifeboats.

(9) Where the number of lifeboats carried in compliance with this rule is more than 13 but less than 20 one of such lifeboats shall be a Class A motor life-boat and a second shall be either a Class A motor lifeboat or a Class B motor lifeboat or a mechanically propelled lifeboat.

(10) Where the number of lifeboats carried in compliance with this rule is 13 or less, one of such lifeboats shall be a Class A motor lifeboat or a Class B motor lifeboat or a mechanically propelled lifeboat.

(11) Every Class A motor lifeboat carried in compliance with this rule shall be fitted with a radio-telegraph equipment, a searchlight and other electrical equipment, in each case complying with the requirements of rule 29.

(12) Every ship to which this rule applies which does not carry two Class A motor life-boats fitted with radiotelegraph equipment, a searchlight and other electrical equipment complying with the requirements of rule 29 shall carry portable radiotelegraph equipment which shall comply with the requirements of rule 30.

(13) Every ship to which this rule applies shall carry at least the number of approved lifebuoys determined in accordance with the following table—

Length of ship in feet	Minimum number of lifebuoys.
Under 200	8
200 and under 400	12
400 and under 600	18
600 and under 800	24
Over 800	30

At least fifty per cent of the lifebuoys required by this rule and in any case not less than six shall be provided with self-signiting lights which cannot be extinguished in water.

(14) Every ship to which this rule applies shall carry one approved lifejacket for each person the ship is certified to carry.

(15) Every ship to which this rule applies shall carry an approved line-throwing appliance.

#### 8. Ships of Class IV.—(1) This rule applies to ships of Class IV.

(2) Every ship to which this rule applies shall, subject to the provisions of rule 43, be provided in accordance with its length, with the number of sets of davits specified in column A of the Table set out in the First Schedule :

Provided that no ships shall be required to have a number of sets of davits greater than the number of lifeboats required to accommodate the total number of persons which the ship is certified to carry.

(3) A lifeboat of not less than 24 feet in length shall be attached to each set of davits and the lifeboats so attached shall together provide at least the capacity specified in column D in the table set out in First Schedule.

(4) Where the lifeboats carried in pursuance of sub-rule (3) do not provide sufficient accommodation for all persons on board additional lifeboats attached to davits shall be carried to make up the deficiency. If it is impracticable to fit such additional sets of davits, additional lifeboats, sufficient to make up the said deficiency, shall be carried under each or any of the lifeboats attached to davits, but shall not be carried under the two emergency boats carried in compliance with sub-rule (7).

(5) If the lifeboats so provided in pursuance of sub-rules (3) and (4) do not provide accommodation for all persons on board, additional lifeboats or approved buoyant apparatus shall be provided so that the total accommodation afforded by all the life boats together with the buoyant apparatus shall be sufficient for the total number of persons which the ship is certified to carry.

(6) Every ship to which this rule applies shall carry, in addition to any buoyant apparatus carried in compliance with sub-rule (5), approved buoyant apparatus sufficient to support 10 per cent of the total number of persons which the ship is certified to carry.

(7) Every ship to which this rule applies shall carry two boats attached to davits—one on each side of the ship—for use in an emergency. These boats shall not be more than 26 ft. in length. They may be counted as lifeboats for the purpose of sub-rule (3) if they comply with the requirements of these rules applying to lifeboats, except that in ships in which the requirements of sub-rule (8) of rule 31 are met by means of appliances fitted to the sides of the lifeboats, such appliances shall not be required to be fitted to the two boats provided to meet the requirements of this rule.

(8) Where the number of lifeboats carried in compliance with this rule is 20 or more, two of such lifeboats shall be Class A motor lifeboats.

(9) Where the number of lifeboats carried in compliance with this rule is more than 13 but less than 20, one of such lifeboats shall be a Class A motor lifeboat and a second shall be either a Class A motor lifeboat or a Class B motor lifeboat or a mechanically propelled lifeboat.

(10) Where the number of lifeboats carried in compliance with this rule is 13 or less, one of such lifeboats shall be a Class A motor lifeboat or a Class B motor lifeboat or a mechanically propelled lifeboat.

(11) Every Class A motor lifeboat carried in compliance with this rule shall be fitted with a radiotelegraph equipment, a searchlight and other electrical equipment, in each case complying with the requirements of rule 29.

(12) Every ship to which this rule applies which does not carry two Class A motor lifeboats fitted with radiotelegraph equipment, a searchlight and other electrical equipment complying with the requirements of rule 29, shall carry portable radiotelegraph equipment which shall comply with the requirements of rule 30.

(13) Every ship to which this rule applies shall carry at least the number of approved lifebuoys determined in accordance with the following table—

Length of ship in feet	Minimum number of lifebuoys.
Under 200	8
200 and under 400	12
400 and under 600	18
600 and under 800	24
800 and over	30

At least fifty per cent of the lifebuoys required by this rule and in any case not less than six shall be provided with self-igniting lights which cannot be extinguished in water.

(14) Every ship to which this rule applies shall carry one approved lifejacket for each person the ship is certified to carry.

(15) Every ship to which this rule applies shall carry an approved line-throwing appliance.

9. **Ships of Class V.**—Rule 8 shall apply to ships of Class V as it applies to ships of Class IV.

10. **Ships of Class VI.**—(1) This rule applies to ships of Class VI.

(2) Every ship to which this rule applies shall, subject to the provisions of rule 43, be provided in accordance with its length, with the number of sets of davits specified in column A of the table set out in the First Schedule :

Provided that no ship shall be required to have a number of sets of davits greater than the number of lifeboats required to accommodate the total number of persons which the ship is certified to carry.

(3) A lifeboat of not less than 24 feet in length shall be attached to each set of davits and the lifeboats so attached shall together provide at least the capacity specified in column D in the table set out in First Schedule.

(4) Where the lifeboats carried in pursuance of sub-rule (3) do not provide sufficient accommodation for all persons on board, additional lifeboats attached to davits shall be carried to make up the deficiency. If it is impracticable to fit such additional davits, additional lifeboats, sufficient to make up the said deficiency, shall be carried under each or any of the lifeboats attached to davits.

(5) If the boats so provided in pursuance of sub-rules (3) and (4) do not provide accommodation for all persons on board, additional lifeboats or approved buoyant apparatus shall be provided so that the total accommodation afforded by all the lifeboats together with the buoyant apparatus shall be sufficient for the total number of persons which the ship is certified to carry.

(6) Where the number of lifeboats carried in compliance with this rule is 20 or more, two of such lifeboats shall be Class A motor lifeboats.

(7) Where the number of lifeboats carried in compliance with this rule is more than 13 but less than 20, one of such lifeboats shall be a Class A motor lifeboat and a second shall be either a Class A motor lifeboat, or a Class B motor lifeboat or a mechanically propelled lifeboat.

(8) Where the number of lifeboats carried in compliance with this rule is 13 or less, one of such lifeboats shall be a Class A motor lifeboat or a Class B motor lifeboat or a mechanically propelled lifeboat.

(9) Every Class A motor lifeboat carried in compliance with this rule shall be fitted with a radiotelegraph equipment, a searchlight and other electrical equipment, in each case complying with the requirement of rule 29.

(10) Every ship to which this rule applies which does not carry two Class A motor lifeboats fitted with radiotelegraph equipment, a searchlight and other electrical equipment complying with the requirements of rule 29 shall carry portable radiotelegraph equipment which shall comply with the requirements of rule 30.

(11) Every ship to which this rule applies shall carry at least the number of approved lifebuoys determined in accordance with the following table—

Length of ship in feet	Minimum number of lifebuoys.
Under 200	8
200 and under 400	12
400 and under 600	18
600 and under 800	24
800 and over	30

At least fifty per cent of the lifebuoys required by this rule and in any case not less than four shall be provided with self-igniting lights which cannot be extinguished in water.

(12) Every ship to which this rule applies shall carry one approved lifejacket for each person the ship is certified to carry.

(13) Every ship to which this rule applies shall carry an approved line-throwing appliance.

#### 11. Ships of Class VII.—(1) This rule applies to ships of Class VII.

(2) Every ship to which this rule applies shall carry one or more lifeboats or boats of sufficient aggregate capacity to accommodate all persons on board. The boats required by this rule shall be so stowed that they can readily be placed in the water on either side of the ship.

(3) Every ship to which this rule applies shall, whenever it is reasonable and practicable, be fitted with a set of davits for each boat so carried.

(4) Every ship to which this rule applies shall carry at least four approved lifebuoys, half of which shall be fitted with self-igniting lights which cannot be extinguished in water.

(5) Every ship to which this rule applies shall carry one approved lifejacket for each person on board.

#### 12. Ships of Class VIII.—(1) This rule applies to ships of Class VIII.

(2) Every ship to which this rule applies shall carry on each side of the ship lifeboats not less than 24 feet in length of such aggregate capacity as will accommodate all persons on board. In the case of tankers of 3,000 tons gross tonnage or upwards, the number of such lifeboats on board shall not be less than four, two of which shall be carried aft and two amidships.

(3) The lifeboats shall be attached to davits.

(4) In every ship to which this rule applies of 1,600 tons gross tonnage or upwards, one of the lifeboats carried in compliance with sub-rule (2) shall be a Class A motor lifeboat, or a Class B motor lifeboat or a mechanically propelled lifeboat.

(5) Every ship to which this rule applies, shall carry portable radio telegraph equipment which shall comply with the requirements of rule 30.

(6) Every ship to which this rule applies shall carry at least eight approved lifebuoys, half of which shall be fitted with self-igniting lights which cannot be extinguished in water.

(7) Every ship to which this rule applies shall carry one approved lifejacket for each person on board.

(8) Every ship to which this rule applies shall carry an approved line-throwing appliance.

#### 13. Ships of Class IX.—(1) This rule applies to ships of Class IX.

(2) Every ship to which this rule applies of 100 feet or over in length shall carry on each side of the ship one or more lifeboats of sufficient aggregate capacity to accommodate all persons on board. Such lifeboats shall be attached to davits.

(3) Every ship to which this rule applies which is under 100 feet in length shall carry one or more lifeboats so stowed that they can be readily placed in the water on either side of the ship, and of sufficient aggregate capacity to accommodate all persons on board.

(4) In every ship to which this rule applies of 1,600 tons gross tonnage or upwards, one of the lifeboats carried in compliance with this rule shall be a Class A motor lifeboat or a Class B motor lifeboat or a mechanically propelled lifeboat.

(5) Every ship to which this rule applies of 1,600 tons gross tonnage or upwards shall carry a portable radiotelegraph equipment which shall comply with the requirements of rule 30.

(6) Every ship to which this rule applies of 100 ft. or over in length shall carry at least eight lifebuoys.

If under 100 feet in length the ship shall carry at least four lifebuoys. At least fifty per cent of the lifebuoys carried in compliance with this rule shall be fitted with self-igniting lights which cannot be extinguished in water.

(7) Every ship to which this rule applies shall carry one approved lifejacket for each person on board.

(8) Every ship to which this rule applies of 500 tons gross tonnage or upwards shall carry an approved line-throwing appliance.

(9) Every ship to which this rule applies when engaged on voyages of such duration that in the opinion of the Central Government the compliance of sub-rule (5) is unnecessary, the Central Government may allow such equipment to be dispensed with.

**14. Ships of Class X.—(1)** This rule applies to ships of Class X.

(2) Every ship to which this rule applies shall comply with the provisions of sub-rules (2), (3), (6) and (7) of rule 13, provided that the Central Government may, subject to such conditions, if any, as they may require, exempt any ship which proceeds to sea only for short distances wholly or partially from the operation of those provisions.

**15. Ships of Class XI.—(1)** This rule applies to ships of Class XI.

(2) Every ship of 145 feet in length or over to which this rule applies shall carry at least two lifeboats, one on each side of the ship, each lifeboat being attached to davits. The life-boats on each side of the ship shall be of sufficient aggregate capacity to accommodate all persons on board. At least four approved lifebuoys shall be carried.

(3) Every ship to which this rule applies of under 145 feet in length but not under 70 ft. in length shall carry a lifeboat of sufficient capacity to accommodate all persons on board, so stowed that it can be readily put in the water on either side of the ship. Every such ship shall also carry approved buoyant apparatus sufficient to support all persons on board. At least four approved lifebuoys shall be carried.

(4) Every ship to which this rule applies which is 70 feet in length or under 70 feet but not under 40 feet in length shall carry a boat so stowed that it can be placed in the water. Every such ship shall also carry approved buoyant apparatus sufficient to support all persons on board. Two approved lifebuoys shall also be carried. Every ship to which this rule applies which is under 40 feet in length shall carry at least two approved lifebuoys.

(5) At least one of the lifebuoys required to be carried in compliance with sub-rule (2), (3) and (4) shall be fitted with a self-igniting light which cannot be extinguished in water.

(6) Every ship to which this rule applies shall carry one approved lifejacket for each person on board.

**16. Ships of Class XII.—(1)** This rule applies to ships of Class XII.

(2) Every ship of 60 tons gross tonnage or over to which this rule applies shall be provided with lifeboats or boats of sufficient aggregate capacity to accommodate all persons on board. The boats required by this rule shall be so stowed that they can be readily placed in the water on either side of the ship.

(3) Every ship of less than 60 tons gross tonnage to which this rule applies shall be provided with a lifeboat or boat or approved buoyant apparatus which singly or collectively provide sufficient aggregate capacity to accommodate or support all persons on board.

(4) Every ship to which this rule applies shall carry at least two approved lifebuoys.

(5) Every ship to which this rule applies shall carry one approved lifejacket for each person on board.

**17. Ships of Class XIII.—(1)** This rule applies to ships of Class XIII.

(2) Every ship of 70 feet in length and over to which this rule applies shall carry a boat or boats of sufficient capacity, to accommodate all persons on board. Such boat or boats shall be so stowed as to be capable of being readily placed in the water on either side of the ship and unless they are lifeboats complying with the specification set forth in rule 18 and the Second Schedule, the ship shall carry approved buoyant apparatus sufficient to support all persons on board.

(3) Every ship of under 70 feet in length to which this rule applies shall carry approved buoyant apparatus sufficient to support all persons on board :

Provided that approved lifebuoys may be substituted for buoyant apparatus on the basis of one lifebuoy for each two persons on board.

(4) Every ship to which this rule applies shall carry at least two approved lifebuoys.

(5) Every ship to which this rule applies shall carry one approved lifejacket for each person on board.

Requirements for Lifeboats, Buoyant Apparatus and other Life-Saving Appliances..

**18. General requirements for Lifeboats.**—(1) All lifeboats carried in compliance with these rules shall be open boats constructed with rigid sides and shall be fitted with internal buoyancy appliances. All lifeboats shall comply with the provisions of the Second Schedule, and shall be of such form and proportions that they shall have ample stability in a seaway, and sufficient freeboard when loaded with their full complement of persons and equipment.

(2) All lifeboats shall be properly constructed for the purpose for which they are intended and shall be of sufficient strength to permit their being safely lowered into the water when loaded with a full complement of persons and equipment.

(3) In all lifeboats all thwarts and side seats shall be fitted as low in the boat as practicable, and bottom boards shall be fitted so that the thwarts shall not be more than 2 feet 9 inches above them.

(4) No lifeboat carried in compliance with these rules shall be less than 16 feet in length.

(5) The weight of a lifeboat when fully laden with persons (calculated at 165 lbs. per person) and equipment shall not exceed 20 tons.

**19. General requirements for Motor Lifeboats.**—(1) Subject to sub-rule (3), every Class A motor lifeboat carried in compliance with these rules shall comply with the following requirements, namely :—

- (a) it shall be fitted with a compression ignition engine which shall comply with the provisions of Part I of the Third Schedule ;
- (b) it shall be provided with fuel sufficient for twenty four hours continuous operation ;
- (c) it shall be capable of going astern ;
- (d) the speed ahead shall be at least six knots in smooth water when loaded with its full complements of persons and equipments.

(2) Every Class B motor lifeboat carried in compliance with these rules shall comply with the following requirements, namely :—

- (a) it shall be fitted with an internal combustion engine which shall comply with the provisions of Part II of the Third Schedule ;
- (b) it shall be adequately provided with fuel ;
- (c) it shall be capable of going astern ;
- (d) the speed ahead shall be at least four knots in smooth water when loaded with its full complement of persons and equipment.

(3) A Class A motor lifeboat may be carried in place of a Class B motor lifeboat or a mechanically propelled lifeboat, and in that event, its fuel supply shall be required to comply only with the requirement of sub-rule 2 (b).

**20. Internal Buoyancy appliances.**—(1) The volume of the internal buoyancy appliances of a motor lifeboat shall be at least equal to that of the buoyancy appliances which would be required under these rules if the lifeboat were not a motor lifeboat and shall be increased above that volume to the extent that such increase is necessary to compensate for the difference between (a) the weight of the motor and its accessories, and if fitted, the searchlight and the radiotelegraph equipment and their accessories and (b) the weight of the additional persons which the lifeboat could accommodate if the motor and its accessories, and if fitted, the searchlight and the radiotelegraph equipment and their accessories were removed.

The volume of the internal buoyancy appliances of a mechanically propelled lifeboat (other than a motor lifeboat) shall similarly be increased to compensate for the weight of the propelling gear.

(2) In the case of lifeboats which accommodate 100 or more persons the volume of the buoyancy appliances shall be increased beyond the volume required by sub-rule (1) to such extent as will ensure the seaworthiness of the lifeboat.

**21. General requirements for a Mechanically Propelled Lifeboat.**—Every mechanically propelled lifeboat carried in compliance with these rules shall comply with the provisions of the Fourth Schedule.

**22. Carrying capacity of Lifeboats.**—(1) Subject to the provisions of sub-rule (2), the number of persons which a lifeboat shall be deemed fit to carry shall be equal to the greatest whole number obtained by dividing by ten the capacity of the boat in cubic feet, determined in accordance with the provisions of the Second Schedule.

(2) The number of persons which a lifeboat is deemed fit to carry shall not exceed the number of adult persons wearing lifejackets for which there is proper seating accommodation arranged in such a way that the persons when seated do not interfere in any way with the use of the oars.

**23. Buoyant Apparatus.**—(1) Buoyant apparatus shall comply with the provisions of the Eighth Schedule. All buoyant apparatus carried in compliance with these rules shall be of such construction that it retains its shape and properties when exposed to the weather on board ship and when in the water. It shall be constructed so as not to require adjustment prior to use.

(2) Buoyant apparatus shall be deemed fit to carry a number of persons—

- (a) ascertained by dividing by 32 the number of pounds of iron which the apparatus is capable of supporting from its grab lines in fresh water, or
- (b) equal to the extent of the perimeter of the apparatus in feet, whichever number shall be the less.

**24. Marking of Lifeboats and Buoyant Apparatus.**—(1) The dimensions of a lifeboat and the number of persons which it is fit to carry shall be clearly marked on it in permanent characters. The name of the ship to which the lifeboat belongs shall be painted on the bows.

(2) The number of persons which a buoyant apparatus is fit to support shall be clearly marked on the apparatus in permanent characters.

**25. Equipment of Lifeboats.**—(1) Subject to the provisions of this rule, the equipment of every lifeboat or boat carried in compliance with these rules on ships of Classes I to XII inclusive shall be as follows :—

- (a) a single banked complement of oars, two spare oars, and a steering oar ; one set and a half of crutches, attached to the lifeboat by lanyard or chain ; a boat hook ;
- (b) two plugs for each plug hole (except when proper automatic valves are fitted) attached to the lifeboat by laynards or chains ; a baler, and two buckets ;
- (c) a rudder attached to the lifeboat and a tiller ;
- (d) a life line becketed round the outside of the lifeboat ;
- (e) a locker suitable for stowage of small items of equipment ;
- (f) two hatchets, one at each end of the lifeboat ;
- (g) a lamp, with oil sufficient for 12 hours ;
- (h) a watertight box containing two boxes of matches not readily extinguished by wind ;
- (i) a mast or masts, with galvanised wire stays together with orange coloured sails which shall be marked for identification purposes with the first and last letter of the name of the ship to which the lifeboat belongs ;
- (j) a compass in binnacle complying with the provisions of Part I of the Fifth Schedule ;
- (k) a sea anchor complying with the provisions of Part II of the Fifth Schedule ;
- (l) two painters of sufficient length and size. One shall be secured to the forward end of the lifeboat with strop and toggle so that it can be released and the other shall be firmly secured to the stem of the lifeboat and be ready for use ;
- (m) a vessel containing one gallon of vegetable, fish or animal oil. A means shall be provided to enable the oil to be easily distributed on the water, and shall be so arranged that it can be attached to the sea anchor ;
- (n) two parachute signals complying with the provisions of Part V of the Fifth Schedule, and six hand flares capable of giving a bright red light ;
- (o) two buoyant smoke signals capable of giving off orange-coloured smoke ;
- (p) means to enable persons to cling to the lifeboat, if upturned, in the form of bilge keels or keel rails, together with grab lines secured from gunwale to gunwale under the keel ;
- (q) a first aid outfit complying with the provisions of Part III of the Fifth Schedule ;
- (r) an electric torch suitable for morse-signalling, together with two spare batteries and two spare bulbs ;
- (s) a daylight-signalling mirror ;
- (t) a jack-knife fitted with a tin opener to be kept attached to the lifeboat with a lanyard ;
- (u) two light buoyant having lines ; and
- (v) a manual pump complying with the provisions of Part IV of the Fifth Schedule.

(2) In ships of Classes VI and X as also ships of Class XII when engaged on voyages between ports situated in India or between any port in India and any port or place on the Continent of India or in the Island of Ceylon, the boats shall not be required to carry the equipment specified in clause (i) to sub-rule (i).

(3) The Central Government may exempt ships of Classes X and XI as also ships of Classes VII and XII when engaged on voyages between ports situated in India or between any port in India and any port or place on the Continent of India or in the Island of Ceylon, from the requirement to carry the equipment specified in clauses (e), (f), (j), (m), (n), (o) and (s) of sub-rule (i).

(4) In ships of Class XI, the lifeboats shall not be required to carry the equipment specified in clauses (i) and (s) of sub-rule (i).

(5) The equipment of every lifeboat or boat carried in ships of Class XIII shall be as follows :—

- (a) four oars with crutches ;
- (b) a boat hook ;
- (c) two plugs for each plug hole ;
- (d) a rudder attached to the boat and a tiller ;
- (e) a life line bucketed round the outside of the lifeboat or boat ;
- (f) a painter of sufficient length and size ;
- (g) a bucket ;
- (h) a baler ;
- (i) a sea anchor complying with the provisions of Part II of the Fifth Schedule ;
- (j) six hand flares capable of giving a bright red light ;
- (k) an electric torch suitable for Morse signalling, together with two spare batteries and two spare bulbs.

(6) No motor lifeboat or mechanically propelled lifeboat shall be required to carry a mast or sails or more than half the complement of oars. Every such lifeboat shall carry two boat hooks.

(7) Every motor lifeboat shall carry two portable fire extinguishers capable of discharging froth, or other substance suitable for quenching oil fires, a receptacle containing a sufficient quantity of sand and a scoop for distributing the sand.

**26. Lifeboats fit to carry more than 60 persons.**—No lifeboat shall be deemed fit to carry more than 60 persons unless :—

- (a) it is a motor lifeboat or a mechanically propelled lifeboat ; and
- (b) it is fitted with means to enable persons in the water to climb into the lifeboat.

**27. Security of Lifeboat Equipment.**—All items of lifeboat equipment not kept in the lifeboat locker, with the exception of the boat hook which shall be kept free for sending off purposes, shall be lightly lashed within the lifeboat. The lashing shall be carried out in such a manner as to ensure the security of the equipment and so as not to interfere with the lifting hooks or to prevent ready loading of, or to impede ready entry into, the lifeboat.

**28. Rations.**—(1) Every lifeboat or other boat carried in compliance with these rules, shall be provided with at least the rations specified in the following scale for each person it is fit to carry.

- (a) 3 quarts i.e., 120 ounces fluid measure of fresh water, the quantity to be increased as far as possible ;
- (b) 16 ounces of biscuits ;
- (c) 16 ounces of barley sugar ;
- (d) 16 ounces of sweetened condensed milk of first quality :

Provided, however, that the rations specified in clauses (b), (c) and (d) of this sub-rule shall not be required to be carried in a ship of Classes VI, X, XI and XIII as also in the case of ships of Classes VII and XII so long as they are engaged on voyages between ports situated in India or between any port in India and any port or place on the Continent of India or in the Island of Ceylon :

Provided further that the rations specified in clauses (b), (c) and (d) of this sub-rule shall not be required to be carried in a ship of Class IX engaged on voyages between ports situated in India or between any port in India and any port or place in the Island of Ceylon in the course of which they do not go more than 20 miles from the nearest land. Such ships shall not be required to carry the above mentioned rations merely by reason of the fact that they cross during their voyage the Gulf of Kutch, Cambay or Manaar.

(2) The water shall be kept in the lifeboat in suitable containers and there shall be provided at least one dipper, which shall be attached to the container by a lanyard, and three rust proof drinking vessels (one graduated in  $\frac{1}{2}$ , 1 and 2 ounces). The water shall be frequently changed so as to ensure that it is always clean and fit for drinking.

(3) All the food specified shall be packed in suitable watertight containers, marked to indicate the contents and shall be stowed in watertight tanks.

**29. Radiotelegraph and other Electrical Equipment in Motor Lifeboats.**—(1) The radiotelegraph equipment to be carried in a Class A motor lifeboat in compliance with sub-rule (10) of rule 5, sub-rule (10) of rule 6, sub-rule (11) of rule 7, sub-rule (11) of rule 8, rule 9 or sub-rule (9) of rule 10 in addition to complying with such of the requirements of the Indian Merchant Shipping (Radio) Rules, 1956 as apply thereto shall comply with the following requirements :—

(a) the radiotelegraph equipment shall be installed in a cabin large enough to accommodate both the apparatus and the person using it;

(b) the arrangements shall be such that the efficient operation of the transmitter and receiver shall not be interferred with by the motor lifeboat engine, whether a battery is on charge or not;

(c) the radiotelegraph battery shall not be used to supply power to any engine starting motor or ignition system.

(2) The motor lifeboat engine shall be fitted with a dynamo capable of recharging all batteries in the lifeboat.

(3) The motor lifeboat shall be provided with a searchlight which shall include a lamp of at least 80 watts, an efficient reflector and a source of power which will give effective illumination of a light coloured object having a width of about 60 feet at a distance of 200 yards for a total period of six hours. The searchlight shall be capable of working for at least three hours continuously.

**30. Portable Radiotelegraph Equipment.**—The portable radiotelegraph equipment required to be carried by sub-rule (11) of rule 5, sub-rule (11) of rule 6, sub-rule (12) of rule 7, sub-rule (12) of rule 8, sub-rule (12) of rule 9, sub-rule (10) of rule 10, sub-rule (5) of rule 12, or sub-rule (5) of rule 13 shall comply with such of the requirements of the Indian Merchant Shipping (Radio) Rules, 1956, as apply thereto, and shall be kept in the chartroom of the ship or other suitable place, ready to be moved into a lifeboat in case of emergency.

**31. Stowage and Handling of Lifeboats and Buoyant Apparatus.**—(1) All lifeboats attached to davits and all lifeboats stowed under lifeboats attached to davits shall be stowed in such a way that :—

(a) they can be launched in the shortest possible time;

(b) they will not impede in any way the rapid handling of any other lifeboats or of any buoyant apparatus, or the marshalling of the persons on board at the launching stations, or their embarkation; and

(c) even under conditions of list and trim unfavourable for the handling of the lifeboats, as large a number of persons as possible can be embarked in them.

(2) In passenger steamers not more than one lifeboat shall be served by a single set of davits, provided that in any ships in which this arrangement is impracticable, the lifeboats may, subject to the provisions of sub-rule (1), be stowed one above the other, or, if the Central Government permits in the case of any ship and subject to such conditions as they may impose, they may be fitted one within another.

(3) If in a passenger steamer a lifeboat is stowed underneath another lifeboat, there shall be provided removable supports or other appliances to secure that the weight of the upper lifeboat is not unduly supported by the lifeboat underneath it.

(4) Lifeboats may only be stowed on more than one deck on condition that proper measures are taken to prevent lifeboats on a lower deck being fouled by those stowed on a deck above.

(5) Lifeboats shall be stowed in such positions as to ensure safe launching. They shall not be placed in the bows of a ship.

(6) (a) Davits shall comply with the provisions of the Seventh Schedule and shall be suitably placed.

(b) In ships over 150 feet in length of Classes I, II, III, IV, V, VI, VIII, IX, X and XI, the davits shall be of the following types :—

(i) luffing or gravity type for operating lifeboats weighing not more than four tons in their turning out condition;

(ii) gravity type for operating lifeboats weighing more than four tons in their turning out condition.

(c) In all ships of 150 feet in length and under, if radial type davits are provided they shall be fitted with means to prevent them from being jerked from their sockets.

(7) In ships of Classes I, II, III, IV, V, VI, VIII, IX, X and XI, the davits, falls, blocks and all other gear shall be of such strength that the lifeboats can be safely lowered when fully loaded with persons and equipment, with the ship listed to 15 degrees either way.

(8) In ships in which the boat deck is more than 15 feet above, the load line indicating the deepest submersion of the ship permitted under the Indian Merchant Shipping (Load Line) Rules, 1934, arrangements shall be made to facilitate launching the lifeboats against an adverse list.

(9) (a) In ships of Classes I, II, III, IV, V, VI, VIII and IX, the lifeboats shall be served by wire rope falls and winches, provided that the Central Government may allow other types of falls to be fitted to any emergency boat carried in compliance with sub-rule (4) of rule 5, sub-rule (4) of rule 6, sub-rule (7) of rule 7, sub-rule (7) of rule 8 and rule 9, and in ships where, having regard to the height of the boat deck above the lightest sea going draught or to other circumstances, it is satisfied that such other falls are adequate.

(b) In ships of Class X, wire rope falls, together with winches, shall be fitted for operating lifeboats weighing more than four tons in fully loaded condition.

(10) Two life lines shall be fitted to the davit spans of all lifeboats and the falls and life lines shall be long enough to reach the water with the ship at her lightest sea going draught and listed to 15 degrees either way. Lower fall blocks shall be fitted with a suitable ring or long link for attaching to the sling hooks unless disengaging gear complying with the provisions of the Sixth Schedule is fitted.

(11) Lifeboats attached to davits shall have their falls ready for service, and means shall be provided for speedily detaching the boats from the falls. The points of attachment of the lifeboats to the falls shall be so situated as to ensure that the lifeboats can be easily swung clear of the davits.

(12) Where more than one lifeboat is served by the same set of davits, separate falls shall be provided to serve each lifeboat, unless the falls are of wire rope. The appliances used shall be such as to ensure lowering the boats rapidly and in turn. Where power appliances are fitted for the recovery of the falls, efficient hand gear shall also be provided.

**32. Lifejackets.**—(1) Every lifejacket carried in compliance with these rules shall be capable of being fitted on the body and shall be constructed in accordance with the provisions of the Tenth Schedule.

(2) Every lifejacket shall be reversible, so that if it is worn back-to-front or inside out, it will satisfy the requirements of clauses (a), (b) and (c) of sub-rule (3).

(3) The distribution of buoyancy in a lifejacket shall be such as to ensure that when worn by a person in the water, it will comply with the following conditions, namely :

(a) when the wearer is inert the position of the body shall be as near the vertical as possible ;

(b) when the wearer is inert his head shall be kept clear of the water ; and

(c) the head shall be so supported that if the wearer becomes unconscious it cannot fall forward and the face become submerged.

(4) Unless lifejackets carried in compliance with this rule can be adapted for use by children, lifejackets suitable for children shall be provided in sufficient number to meet the requirements of each voyage.

(5) The buoyancy of lifejackets shall not depend on air compartments.

**33. Lifebuoys.**—(1) Every lifebuoy carried in compliance with these rules shall be constructed of cork, evenly formed and securely plugged, or other equally efficient buoyant material, and shall be capable of floating in fresh water for at least 24 hours with 32 lb. of iron suspended from it.

(2) Lifebuoys shall be constructed in accordance with the provisions of the Ninth Schedule.

(3) Lifebuoys shall not be filled with rushes, cork shavings, granulated cork or any other loose granulated material, and their buoyancy shall not depend upon air compartments requiring inflation.

**34. Lifebuoy Lights and Lines.**—(1) In every ship to which these rules apply, one approved lifebuoy on each side of the ship shall be fitted with a line at least 15 fathoms in length.

(2) In tankers the self-igniting lights shall be electrically operated.

**35. Stowage of Lifebuoys and Lifejackets.**—(1) Lifebuoys and lifejackets shall be so stowed so as to be readily accessible to all persons on board. The position of lifejackets shall be clearly and permanently indicated.

(2) Lifebuoys shall always be capable of being rapidly cast loose.

**36. Line-throwing Appliances.**—(1)(a) In ships of 75 feet or over in length, a line-throwing appliance, if required by these rules, shall consist of an apparatus conforming with the provisions of sub-rules (2), (3) and (4), and be capable of throwing a line  $\frac{1}{2}$  inch in circumference a minimum distance of 250 yards in calm weather.

(b) In ships of under 75 feet in length, a line-throwing appliance, if required by these rules, shall consist of an apparatus conforming with the provisions of sub-rules (2) and (3) and (4), and be capable of throwing a line  $\frac{1}{2}$  inch in circumference a minimum distance of 200 yards in calm weather.

(2) The apparatus shall include 4 rockets and 4 lines, each line being  $\frac{1}{2}$  inch in circumference and of suitable length, and having a breaking strain of not less than 250 pounds.

(3) All line-throwing appliances shall be capable of throwing the line in such a manner that the lateral deflection of the line on either side of the direction of firing does not exceed 10 per cent of the length of flight of the rocket.

(4) The lines and the rockets, with means of igniting them, shall be kept in a watertight case.

#### MISCELLANEOUS PROVISIONS

**37. Embarkation in the Lifeboats.**—(1) In every ship of Classes I, II, III, IV, V, VI, VIII, IX and X, one ladder shall be carried at each set of davits. The ladders shall be of sufficient length to reach the water line with the ship at her lightest sea-going draught and listed to 15 degrees either way.

(2) In every ship arrangements shall be made for warning the passengers and crew when the ship is about to be abandoned.

(3) Every ship of Classes I, II, III, IV, V, VI, VIII, IX and X shall be provided with means situated outside the engine room whereby any discharge of water into the lifeboats can be prevented.

**38. Electrically Operated Signals.**—Every ship of Classes I, II, III, IV and V shall be provided throughout the ship with electrically operated signals controlled from the bridge of summoning passengers to muster stations.

39. (1) In every ship of Classes I, II, III, IV, V and VI an electric lighting system shall be provided throughout the ship and in particular upon the decks on which the lifeboats are stowed. Provision shall also be made in every such ship for the electric lighting of the launching gear and of the lifeboats in process of and immediately after being launched. The lighting shall be operated from the ship's main generating plant and so arranged that power may be supplied from an emergency source of power.

(2) In every ship of Classes I, II, III, IV, V and VI the exit from every main compartment occupied by passengers or crew shall be continuously lighted by an emergency electric lamp, operated from the ship's main generating plant and so arranged that power may be supplied from an emergency source of power.

(3) In every ship of Classes VIII, IX, X and XI, means shall be provided for the electric lighting of the launching gear and lifeboats during the process of launching.

**40. Certificated Lifeboatmen.**—(1) The crew of every ship of Classes I, II, III, IV, V and VI shall include, for each lifeboat carried in compliance with these rules, a number of certificated lifeboatmen not less than that specified in the following table—

Prescribed complement of lifeboat	Minimum number of Certificated Lifeboatmen
Less than 41 persons	2
From 41 to 61 persons	3
From 62 to 85 persons	4
More than 85 persons	5

(2) An applicant for the lifeboatman's certificate shall be at least 18 years of age and shall submit himself for examination at such time and place as may be directed by the Central Government who, on being satisfied that he has had sufficient service at sea and has been trained in all the operations connected with launching lifeboats and the use of oars, that he is acquainted with the practical handling of the boats themselves, and, further, that he is capable of understanding and answering the orders relative to lifeboat service, may issue a certificate to him.

(3) For the purpose of this rule,

"Certificated lifeboatman" means any member of the crew who holds a certificate issued by or under the authority of the Central Government in accordance with the conditions laid down in sub-rule (2) of this rule;

"prescribed complement" means the number of persons which a boat is fit to carry under these rules.

**41. Manning of Lifeboats.**—(1) In every ship of Classes I, II, III, IV and V, a deck officer or a certificated lifeboatman shall be placed in charge of each lifeboat and a second in command shall also be nominated. In every ship of Classes VI, VIII and IX, if it is possible to do so, a deck officer shall be placed in charge of each boat. The person in charge shall have a list of the lifeboat's crew and shall see that the men placed under his orders are acquainted with their several duties.

(2) In ships of Classes I, II, III, IV, V, VI and VIII, a man capable of working the radiotelegraph and searchlight equipment shall be assigned to each lifeboat carrying such equipment.

(3) In ships of Classes I, II, III, IV, V, VI and VIII, a man capable of working the motor shall be assigned to each motor lifeboat.

**42. Ship's Distress Rocket Signals.**—(1) Every ship of Classes I, II, III, IV, V, VI and VIII and every ship of 50 feet in length and over of Classes IX, X and XI shall be provided with not less than 12 parachute distress rocket signals which shall comply with the provisions of the Eleventh Schedule.

(2) Every ship of less than 50 feet in length of Classes IX, X and XI and every ship of Class XIII shall be provided with not less than 12 pyrotechnic distress signals which shall be either parachute signals of a type which complies with the provisions of the Eleventh Schedule or red hand flares capable of emitting five red stars into the air to a height of not less than 150 feet.

(3) All pyrotechnic distress signals shall be packed in a water-tight container and shall be clearly and indelibly labelled to indicate their purpose.

**43. Equivalents and Exemptions.**—(1) Where these rules require that a particular fitting, appliance or apparatus, or type thereof, shall be fitted or carried in a ship or that any particular provision shall be made, the Central Government may allow any other fitting, appliance or apparatus or type thereof, to be fitted or carried, or any other provision to be made in that ship if it is satisfied by trial thereof that such other fitting, appliance or apparatus, or type thereof, or provisions, is at least as effective as that required by these rules.

(2) If it appears to the Central Government, on the application of the owner of any ship, that it is not practicable or reasonable to fit in that ship the number of sets of davits required by these rules, it may allow one or more sets of davits to be dispensed with in that ship subject to such conditions, if any, as it may think fit:

Provided that, in the case of a ship of Classes I, II, III, IV and V, the number of sets of davits fitted shall in no case be less than the minimum number determined by Column B of the table in the First Schedule.

(3) The Central Government may exempt any ship not normally engaged on international voyages but which, in exceptional circumstances, is required to undertake a single international voyage from any of the requirements of these rules, provided that it complies with safety requirements which, in the opinion of the Central Government, are adequate for the voyage which is to be undertaken by the ship.

(4) If it is impracticable for a ship to carry a lifeboat of the minimum length prescribed by these rules, the Central Government may allow a smaller boat to be carried by that ship.

(5) The Central Government may, on such conditions as it thinks fit, exempt any ship constructed before the coming into operation of these rules, from any of the requirements of these rules if it is satisfied that compliance with that requirement is either impracticable or unreasonable in the case of that ship.

**44. (1)** Every memorandum issued under sub-section (3) of section 245-F shall be in the form set out in the Twelfth Schedule.

(2) When such a memorandum has been obtained by the owner or master of a ship, the number of persons stated in the memorandum shall, for the purposes of these rules, be treated as the number of persons which the ship is certified to carry.

(3) Every such memorandum shall be returned at the end of the voyage to which it relates to the officer from whom it was obtained.

**45. Penalty.**—Whoever does any act in contravention of any of the provisions of these rules, shall be punishable with fine which may extend to two hundred rupees, and if the breach is a continuing one, with a further fine which may extend to twenty-rupees, for every day after the first during which the breach continues.

## THE FIRST SCHEDULE

[See Rules 5 to 10 and 43 (2)]

## TABLE

(Showing the minimum sets of davits and minimum total cubic capacity of Lifeboats,  
Classes I to VI)

Registered length of the ship in feet	(A) No. of sets of davits	(B) Minimum number of sets of davits	Minimum aggregate capacity of lifeboats in C. ft:	
			(C) For interna- tional voyages	(D) For short internation- al voyages
100 and under 120	.	2	784	400
120 ,,, 140	.	2	975	650
140 ,,, 160	.	2	1,240	900
160 ,,, 175	.	3	1,500	1,150
175 ,,, 190	.	3	1,910	1,350
190 ,,, 205	.	4	2,200	1,550
205 ,,, 220	.	4	2,660	1,750
220 ,,, 230	.	5	3,120	1,850
230 ,,, 245	.	5	3,650	2,150
245 ,,, 255	.	6	4,080	2,400
255 ,,, 270	.	6	4,510	2,700
270 ,,, 285	.	7	4,950	3,000
285 ,,, 300	.	7	5,540	3,300
300 ,,, 315	.	8	6,040	3,600
315 ,,, 330	.	8	6,630	3,900
330 ,,, 350	.	9	7,200	4,300
350 ,,, 370	.	9	7,700	4,750
370 ,,, 390	.	10	8,520	5,150
390 ,,, 410	.	10	9,360	5,550
410 ,,, 435	.	12	10,450	6,050
435 ,,, 460	.	12	11,540	6,550
460 ,,, 490	.	14	12,740	7,150
490 ,,, 520	.	14	13,850	7,800
520 ,,, 550	.	16	14,980	8,400
550 ,,, 570	.	16	16,280	..
580 ,,, 610	.	18	17,520	..
610 ,,, 640	.	18	18,960	..
640 ,,, 670	.	20	20,280	..
670 ,,, 700	.	20	21,640	..

## THE SECOND SCHEDULE

(See rules 18, 20 and 22)

*Construction And Capacity of Lifeboats*

(1) Every boat shall have a mean sheer at least equal to four per cent of its length.

(2) The air cases of every boat shall be so placed as to secure stability when fully laden under adverse weather conditions.

(3) Internal buoyancy appliances shall be constructed of copper or yellow metal of not less than 18 ozs. to the superficial foot.

(4) The buoyancy of a wooden boat shall be provided by watertight air cases, the total volume of which shall be at least equal to one-tenth of the cubic capacity of the boat.

(5) The buoyancy of a metal boat shall not be less than that required for a wooden boat of the same cubic capacity, and the volume of watertight air cases shall be increased accordingly.

(6) Subject to the provisions of paragraph (9) of this Schedule, the cubic capacity of a lifeboat for the purposes of these rules shall be measured in cubic feet and shall be determined by Stirling's (Simpson's) Rule, that is to say, by the following formula :—

$$\text{Cubic Capacity} = \frac{L}{12} (4A + 2B + 4C) \quad \text{where } L \text{ denotes the length of the boat in feet from the inside of the planking or plating at the stem to the corresponding point at the stern post ; in the case of a boat with a square stern the length is measured to the inside of the transom.}$$

A, B, C denote respectively the areas of the Cross-sections at the quarter length forward, amidships, and the quarter length aft, which correspond to the three points obtained by dividing L into four equal parts (the areas corresponding to the two ends of the boat shall be considered negligible).

The areas A, B, and C shall be deemed to be given in square feet by the successive application of the following formula to each of the three cross-sections,

$$\text{Area} = \frac{h}{12} (a + 4b + 2c + 4d + e)$$

where h denotes the depth measured in feet inside the planking or plating from the keel to the level of the gunwale, or, in certain cases, to a lower level, as determined hereafter ; a, b, c, d, e denotes the horizontal breadths of the boat measured in feet inside the planking or plating at the upper and lower points of the depth and at the three points obtained by dividing h into four equal parts (a and e being the breadths at the extreme points, and c at the middle point of h). The capacity of a square sterned boat shall be calculated as if the boat had a pointed stern.

(7) If the sheer of the gunwale, measured at the two points situated at a quarter of the length of the boat from the ends, exceeds 1 per cent. of the length of the boat, the depth employed in calculating the area of the cross-section A or C shall be deemed to be the depth amidships plus 1 per cent of the length of the boat.

(8) If the depth of the boat amidships exceeds 45 per cent. of the breadth the depth employed in calculating the area of the amidship cross-section B shall be deemed to be equal to 45 per cent. of the breadth and the depth employed in calculating the areas of the quarter length sections A and C is obtained by increasing this last figure by an amount equal to 1 per cent. of the length of the boat, provided that in no case shall the depths employed in the calculation exceed the actual depths at these points.

(9) Unless the owner of the boat requires the cubic capacity to be determined by exact measurement, the cubic capacity may be assumed to be the product of the length, the breadth and the depth multiplied by 0.6 if this formula does not give a greater capacity than that obtained by the formula set out in paragraph (6) of this Schedule. The dimensions shall be measured in the following manner :—

Length—From the intersection of the outside of the planking with the stem to the corresponding point at the stern post, or in the case of a square sterned boat, to the after side of the transom.

Breadth—from the outside of the planking at the point where the breadth of the boat is greatest.

Depth—Amidships inside the planking from the keel to the level of the gunwale, but the depth used in calculating the cubic capacity may not in any case exceed 45 per cent. of the breadth.

(10) The cubic capacity of a motor boat shall be obtained from the gross capacity by deducting a volume equal to that occupied by the motor and its accessories and, when carried, the radiotelegraph equipment and searchlight with their accessories.

## THE THIRD SCHEDULE

[See rule 19 (1)]

*Machinery of Motor Lifeboats*

## PART I

*Class A motor lifeboats*

(1) The engine shall be capable of being started readily in cold weather and of running reliably in such weather.

(2) The engine shall operate properly under conditions of at least 10° list and 10° trim. Circulating water pumps shall be self-priming.

(3) The engine and its accessories, including the fuel tank, pipes and fittings, shall be adequately protected to ensure reliable operation under conditions likely to arise at sea during heavy weather.

(4) In a wooden lifeboat a metal tray shall be fitted under the engine.

(5) The fuel tank shall be substantially constructed. No part of the fuel tank or its fittings shall depend on soft solder for tightness. If made of steel the fuel tank shall be galvanised externally. The fuel tank and its connections shall be capable of withstanding hydraulic pressure corresponding to a head of at least 15 feet. The fuel tank shall be securely fixed in position and be fitted with suitable filling and relief arrangements. A metal tray shall be fitted under the fuel tank.

(6) The engine shall be covered in and the casing shall be of steel or shall be fireproofed.

(7) The engine and fuel tank spaces shall be efficiently ventilated.

(8) The shafting and other moving parts shall be fenced where necessary to protect the persons in the boat from injury.

## PART II

[See rule 19 (2)]

*Class B motor lifeboats*

(1) The engine shall be capable of being started readily in cold weather and of running reliably in such weather.

(2) The engine shall operate properly under conditions of at least 10° list and 10° trim. Circulating water pumps shall be self-priming.

(3) The engine and its accessories, including the fuel tank, pipes and fittings, shall be protected to ensure reliable operation under conditions likely to arise at sea during heavy weather.

(4) In a wooden lifeboat a metal tray shall be fitted under the engine.

(5) The magneto, carburettor and air inlet of any electric ignition engine installed in the lifeboat shall be placed as high as possible. If an electric ignition engine is not fitted in a watertight casing, provision shall be made to protect the magneto, sparking plugs and other electric ignition fittings from the sea.

(6) The fuel tank shall be substantially constructed of suitable material. No part of the fuel tank or its fittings shall depend on soft solder for tightness. If made of steel the fuel tank shall be galvanised externally. The fuel tank and its connections shall be tested by hydraulic pressure corresponding to a head of at least 15 feet. The fuel tank shall be securely fixed in position and be furnished with suitable filling and relief arrangements. A metal tray shall be fitted under the fuel tank.

(7) The engine shall be covered in and the casing shall be of steel or be fireproofed.

(8) The engine and fuel tank spaces shall be efficiently ventilated.

(9) The shafting and other moving parts shall be fenced where necessary to protect the persons in the boat from injury.

## THE FOURTH SCHEDULE

(See rule 21)

*Mechanically Propelled Lifeboats Other Than Motor Lifeboats*

(1) The propelling gear shall be so arranged that it can be rapidly and easily made ready for service and will not interfere with the rapid embarkation of persons in the life-boat.

(2) If the propelling gear is manually operated it shall be capable of being operated by persons untrained in its use and shall be capable of being operated when the lifeboat is flooded.

(3) The propelling gear shall not require adjustment to enable it to be worked by persons of different stature. It shall be effective in propelling the lifeboat partially or fully loaded.

(4) The propelling gear shall be substantially constructed and fitted to the lifeboat in an efficient manner.

(5) The propelling gear shall be of sufficient power to enable the lifeboat to be propelled at a speed when going ahead of 3·5 knots in smooth water over a distance of  $\frac{1}{2}$  mile.

(6) The propelling gear shall be capable of propelling the lifeboat ahead and astern.

#### THE FIFTH SCHEDULE

[See rule 25 (1) (j) ]

##### *Lifeboat Equipment*

###### PART I

###### *Life-boat compasses*

(1) The compass shall be of the liquid type. The liquid used shall be a mixture of industrial methylated spirit and water, specific gravity 0·93 at 60° F. It shall be clear, free from sediment, cloudiness and dirt defects. The compass shall function efficiently over a temperature range — 10° F. to +120° F.

(2) The magnet shall have ample directive force. In the United Kingdom a period of 18 to 22 seconds after a deflection of 40° at a temperature of about 60° F. will be deemed to comply with this requirement. For the purposes of this paragraph a "period" is the time taken by a complete oscillation of the card after a deflection of 40° a swing past the position of rest, and back again to the completion of its swing on the side to which it was originally deflected.

(3) Over a range of — 10° F. to +120° F. the card system when immersed in the compass liquid shall rest on the pivot with a weight between 4 and 10 grammes.

(4) The card shall be not less than 4 inches in diameter and shall have a clearance from the bowl of at least  $\frac{1}{4}$  inch. It shall be marked to half points, the eight principal points being distinctively marked. The card shall be luminised.

(5) The centre shall be of sapphire or equally hard jewel, and shall be removable from the float.

(6) The pivot shall be of iridium or equally suitable hard material.

(7) The arrangements made to allow for the expansion and contraction of the liquid shall enable the compass to withstand a temperature range of — 10° F. to +120° F. without leakage, formation of bubbles or other defects.

(8) The bowl shall be adequately weighted and properly poised in the gimbals which shall give a fore and aft and thwartship action. The gimballing shall be in the same horizontal plane as the point of suspension of the card and the outer gimbal pins shall be placed fore and aft. The bowl shall be placed in a binnacle or box of non-magnetic material and the rubber line or points shall be luminised. The card system shall remain free when the bowl is tilted by 10°.

(9) The direction of the rubber line or point from the centre of the card shall lie in the same vertical plane as the outer gimbal axis or other fore and aft datum line. The cumulative effect of card, pivot, directional and other similar errors, and of inaccurate positioning of the lubber's point, shall be such that in the undisturbed earth's field the direction as read on the card against the lubber's point shall not differ by more than 3° from the magnetic direction of the outer gimbal axis or other fore and aft datum line for any direction of the latter.

(10) The minimum thickness of the metal used in the construction of the compass shall be as follows :—

Compass bowl . . . . .	21 S.W.G.
Binnacle . . . . .	24 S.W.G.
Lamp . . . . .	24 S.W.G.

The compass bowl shall be efficiently stiffened to take gimbal pins. The binnacle shell shall be swaged or spun into the base ring and soldered all round.

The gimbal ring shall be of naval brass or other rigid non-magnetic metal  $\frac{5}{8}$  inch by  $\frac{1}{8}$  inch. Gimbal pins shall be of naval brass or other hard non-magnetic material of  $\frac{1}{4}$  inch diameter; both they and the bearings in which they engage shall be perfectly smooth.

- (11) The paint inside the bowl shall show no sign of blistering.  
(12) The materials and workmanship shall be good throughout and the compass shall be such as will remain efficient under sea-going conditions.  
(13) The bowl of the compass shall be engraved or stamped with the maker's name or other identification mark.

PART II

[See rule 25 (1) (k) and 5(5)(i)]

### *Lifeboat sea anchors*

- (i) Every lifeboat sea anchor shall comply with the following requirements :—

  - (a) It shall be constructed of No. 1 best flax canvas, or other suitable material.
  - (b) The canvas part shall be strongly sewn together and be roped at the seams with  $1\frac{1}{2}$ " bolt rope ; the ropes then being formed into a bridle with a thimble seized in the connecting end, and the ropes extended and seized into a parcelled loop to form the attachment for the tripping line.
  - (c) A hawser shall be attached to the sea anchor by means of a shackle of suitable size to take the thimble.
  - (d) The length of the hawser shall be three times the life-boat's length.
  - (e) A tripping line two fathoms longer than the hawser shall be provided.

(2) A circular sea anchor shall be fitted at the mouth with a galvanized iron hoop. Any other type of sea anchor shall be fitted with galvanised iron spreaders across the mouth and with an ash spreader at the upper edge.

(3) The size of lifeboat sea anchors shall be as follows :—

  - (a) For lifeboats not over 22 feet in length—Circular sea anchors—Mouth 24" diameter. Non-circular folding sea anchors—Mouth  $21\frac{1}{2}$ " each side.  
Length of canvas bag—3' 6".  
Hawser— $2\frac{1}{2}$ " in circumference.  
Tripping line— $1\frac{1}{2}$ " in circumference.
  - (b) For lifeboats over 22 feet in length, but not over 30 in length—  
Circular sea anchors—Mouth 27" diameter.  
Non-circular folding sea anchors—mouth 24" each side.  
Length of canvas bag—4'  
Hawser—3" in circumference.  
Tripping line—2" in circumference.
  - (c) For lifeboats over 30 feet in length—  
Non-circular folding sea anchors—Mouth 30" upper edge, 27" lower edge,  
 $27\frac{1}{2}$ " each side.  
Area of mouth 770 sq. inches.  
Length of canvas bag—4' 6".  
Hawser—3" in circumference.  
Tripping line—2" in circumference.

### PART III

[See rule 25 (1) (q)]

### *Lifeboat first aid outfit*

- (e) The contents of every lifeboat first aid outfit shall comply with the standards of the British Pharmacopoeia, where such standards are applicable, and shall include the following :—

- (a) Collapse Revivers (6 capsules) . . . . . 1 Tin.  
 (b) Codeine Compound tablets (Tab. Codeine Co. N.W.F.) . . . 25 tablets.  
 (c) Six tubunic Ampoules of "Omnopon" each containing  $\frac{1}{2}$  gr.,  
     "Omnopon" equivalent to  $\frac{1}{2}$  gr. anhydrous morphine . . . 1 Tins.

(d) First Field Dressings or Standard Dressings No. 14 . . . . .	2
(e) Shell Dressings or Standard Dressings No. 15 . . . . .	2
(f) Elastic Adhesive Dressings 2' x 3', packets of three . . . . .	2 Packets.
(g) Bandage, Triangular, illustrated, 38" sides x 54" base, compressed . . . . .	5
(h) Gauze, white, absorbent, compressed 36" x 2½ yards . . . . .	3
(i) Roller Bandage, 2½" x 4 yards compressed . . . . .	4
(j) Bandage, Calico, unbleached, 6" . . . . .	1 x 6 yards.
(k) Cotton Wool, compressed, 4 oz. packet. . . . .	1
(l) Safety Pins of rustless stainless metal . . . . .	6
(m) Paraffin Jelly, 1 oz. tubes . . . . .	1 Tube.
(n) Scissors, 4", 1 sharp, 1 blunt point, or blunt pointed, or rustless stainless metal . . . . .	1
(o) Energy Tablets, 10 mg. . . . .	60 Tablets.
(p) Silica Gel . . . . .	1 Capsule.
(q) Ampoule-Syringes containing Total Opium alkaloids . . . . .	1 Box.
(r) Instructions printed on linen	

(2) The container for the first aid outfit shall comply with the following requirements :—

- (a) It shall be made of a metal of a strength which will withstand hard wear under conditions met with at sea.
- (b) A handle shall be fitted to the lid. .
- (c) It shall be hermetically sealed and damp-proof. It shall also be sealed with a piece of wire soldered to the lid and the body of the container to indicate that the contents are intact.
- (d) It shall be packed in a room from which atmospheric moisture has been removed as far as possible.
- (e) It shall be well tinned and lacquered.
- (f) An itemised list of the contents shall be given on the outside of the container.

#### PART IV

[See rule 25 (1) (v)]

##### *Lifeboat manual pumps*

Lifeboat manual pumps shall comply with the following requirements :—

- (1) The capacity when operated at not more than 60 double strokes per minute, at 4 feet suction head, shall be not less than (a) 5 gallons per minute in lifeboats of under 24 feet in length and (b) 7 gallons per minute in lifeboats of 24 feet in length and over.
- (2) In its normal dry state (excluding internal grease or other assistance) the pump shall be readily self priming when operated on a suction head of not less than four feet.
- (3) All parts of the pump shall be of non-corrodible material unaffected by sea water.
- (4) The interior of the pump, including valves, shall be readily accessible for emergency cleaning, and the cover for access shall be capable of being easily removed without the use of a spanner or other special tool.
- (5) The pump branches shall be suitable for use with 1½ inches bore rubber hose connections. The metal part of the operating handle shall be suitably sheathed by material other than wood so as to protect the hands of the operator when the pump is used in extreme cold. The spindle gland shall be of the spring loaded seal ring type.

#### PART V

[See rule 25 (1) (n)]

##### *Lifeboat Parachute Distress Rocket Signals*

- (1) A life-boat parachute distress rocket signal shall consist of a single bright red star which is projected to the required height by means of a rocket, and which burns while

falling, its rate of fall being controlled by means of a small parachute to 15 feet per second. It is to be fitted with a self-contained means of ignition, so designed as to operate from the hand-held position without external aid, and such as to enable the rocket to be discharged from a lifeboat without harm to the occupants.

(2) When the rocket is fired approximately vertically, the star and parachute shall be ejected at or before the top of the trajectory, at a minimum height of 600 feet. The rocket shall also be capable of functioning when fired at an angle of 45 degrees to the horizontal.

(3) The star shall burn with a minimum luminosity of 10,000 candle power for not less than 30 seconds. It shall burn out at a height of not less than 150 feet from the sea level.

(4) The parachute shall be of such a size as to provide the required control of the rate of fall of burning star. It must be attached to the star by means of a flexible fireproof harness.

(5) The rocket shall be waterproof and capable of satisfactory functioning after immersion in water for one minute.

(6) All components, compositions and ingredients, shall be of such a character and of such a quality as to enable the rocket to maintain its serviceability under good average storage conditions for a period of at least two years.

(7) The rockets shall be packed in a container hermetically sealed.

(8) The date on which rockets are filled shall be stamped indelibly on the rockets and on the containers.

#### THE SIXTH SCHEDULE

[ See rule 31 (10) ]

##### *Life-Boat Disengaging Gears*

(1) Lifeboat disengaging gear shall be so arranged as to ensure simultaneous release of both ends of the lifeboat.

(2) The means of effecting release shall be placed aft.

(3) The gear shall be of a type which will permit the release of the life-boat only when it is waterborne.

(4) The gear shall be of a type which will permit release should there be a towing strain on the link or falls.

(5) The hooks shall be suitable for instant unhooking by hand.

(6) The point of attachment of the hook to the eye, ring or link of the block shall not be lower than when ordinary fixed hooks are fitted.

(7) The gear and mechanism for effecting release shall be so constructed and arranged as to ensure the safety of the lifeboat independently of any safety pins.

(8) The means for effecting release shall be by hauling on or letting go a line, or by using a lever. If release is effected by a pull upon a line, the line shall be properly cased in. Rods or other connections between hooks shall also be cased in whenever this is necessary for the safety or the efficient action of the gear or for the protection of persons from injury.

The fairleads shall be properly arranged to prevent the lines from jamming or nipping, and shall be strongly attached to permanent parts of the lifeboat. The lines shall be fitted with chains where necessary for efficiency.

(9) Such part of the gear as would otherwise be likely to be set fast by rust or corrosion shall be made of non-corrodible metal.

(10) No part of the gear taking the weight of the lifeboat shall be made of cast metal.

(11) The scantlings and proportions of all parts which support the weight of the lifeboat shall be designed to provide breaking strength proportionate to a load of at least  $\frac{1}{2}$  times the weight of the heaviest loaded lifeboat in which the gear is intended to be fitted.

## THE SEVENTH SCHEDULE

[See rule 31 (6) (a)]

*Davits And Lifeboat Launching Gear*

## PART I

*Construction*

(1) *Definition of working load.*—For the purposes of this Schedule the expression "working load" means the sum of the weight of the lifeboat, the equipment, the blocks and falls and the maximum number of persons with which the lifeboat is required to be lowered into the water, the weight of each person being taken to be 165 lbs. provided however that if two lifeboats are served by the same pair of davits, the working load in relation to those davits shall be the maximum load that may be imposed on them at any time.

(2) *Luffing davits.*—The operating gear of luffing type davits shall be of sufficient power to ensure that the lifeboats fully equipped and manned with the launching crew, but not loaded with other persons, can be turned out against a list of at least 15 degrees.

(3) *Gravity davits.*—(a) In the case of gravity type davits comprising arms mounted on rollers which engage with and travel down fixed inclined trackways, the trackways shall be inclined at an angle of not less than 30 degrees to the horizontal when the vessel is upright.

(b) Gravity davits of other types shall be so designed that there is a positive turning out moment during the whole of the davit travel from the inboard to the outboard position when the vessel is listed up to 25 degrees, either way.

(c) Where gravity type davits are fitted with electric motors for recovering the lifeboats, automatic cut-outs shall be fitted and arranged to operate before the davits come against the runway stops in order to avoid overstressing the wire rope falls or davits.

(4) *Stresses.*—The designed stress on the davits arms, when operating under maximum load and conditions of list, shall afford an adequate factor of safety, having regard to the quality of the material used, the method of construction, and the live nature of the load to which the davits are subjected.

(5) *Static load test.*—In the case of all davits made of cast steel, or of wrought steel or other material fabricated by a welding process, the davits with their arms at full outreach shall be capable of withstanding a static load test of not less than 2½ times the working load.

(6) *Attachments at the davit head.*—The attachments at the davit head from which the blocks are suspended shall be capable of withstanding a proof load test of not less than 2½ times the working load.

(7) *Blocks.*—(a) Lifeboat blocks shall be of ample strength having regard to the working load upon the davits.

(b) In the case of metal blocks the material used shall be of ductile quality and adequate strength. No part of gear intended to bear the weight of a lifeboat shall be constructed of cast metal unless the Central Government so allow in the case of any ship. Metal blocks shall be capable of withstanding a proof load test of not less than 2½ times the working load on the davits. There shall be ample clearance between the cheeks of blocks in which cordage rope is used. The width between the cheeks shall be half an inch greater than the diameter of new cordage ropes when those ropes are 3½" in circumference, and less in proportion to the circumference of the ropes when they are smaller.

(8) *Wire ropes.*—(a) The breaking tensile load of wire ropes used for lowering boats shall be not less than six times the working load.

(b) Wire ropes shall be securely attached to the drum of the winch and the end attachments of wires and other parts from which the lifeboat is to be suspended shall be capable of withstanding a proof load of not less than 2½ times the working load.

(c) Where wire splices are used they shall be capable of withstanding a proof test of not less than 2½ times the working load unless sample splices of each size of wire when tested to destruction, give a factor of safety at the splice of not less than 5.

(9) *Winches.*—(a) Winch drums shall be arranged to keep the two falls separate and to enable them to be payed out at the same rate. The leads of wire ropes shall be such that they will wind evenly on the drums. Lead blocks shall be arranged at least 7 feet from the winch drums.

(b) The brakes of lifeboat winches shall be of robust construction and afford complete control and limitation of speed in the operation of lowerings. The hand brakes shall be so arranged that it is normally in the "ON" position and returns to the "ON" position when the control handle is not being operated. The weight on the brake lever shall be

sufficient to operate the brake effectively without additional pressure. The brake gear shall include means for automatically controlling the speed of lowering to ensure that the boat is lowered expeditiously without exceeding a rate of lowering consistent with safety. For this purpose, the automatic brake shall be set to give a speed of lowering of the lifeboat of between 60 and 120 feet per minute. Ratchet gear shall be incorporated in the hand brake mechanism of lifeboat winches. Where practicable the brake gear shall be so situated as to enable the man operating the winch to have the lifeboat under observation during the whole process of its being launched into the water.

(c) When more than one lifeboat is served by the same wire falls the winches shall be fitted with quick return hand gear to enable the falls to be rapidly recovered, the lower blocks, when fitted, shall be non-toppling, and, where necessary, provisions shall be made to prevent the falls from cabling.

(10) *Cordage rope falls.*—(a) Cordage ropes used for falls shall be durable, unkinkable, firmly laid and pliable. They shall be able to pass freely under any conditions through a hole 3/8 inch larger than the nominal diameter of the rope.

(b) The breaking loads of cordage ropes shall be not less than

Size of Rope	Breaking Load
3 $\frac{1}{2}$ " . . . . .	6 Tons.
3 $\frac{1}{2}$ " . . . . .	5.25 Tons.
3 $\frac{1}{4}$ " . . . . .	4.5 Tons.
3" . . . . .	3.85 Tons.
2 $\frac{1}{2}$ " . . . . .	3.25 Tons.
2 $\frac{1}{2}$ " . . . . .	2.7 Tons.
2 $\frac{1}{4}$ " (Ordinary Quality) . . . . .	2.2 Tons.

(c) Cordage ropes of less than 2 $\frac{1}{4}$ " shall not be used for lifeboat falls. Winding reels or flaking boxes for the falls shall be provided.

(d) Where cordage rope falls are used to serve two lifeboats stowed one above another under one pair of davits, a separate set of blocks and falls shall be provided for each lifeboat. The falls for the first lifeboat to be launched shall be attached to the davits and to the lifeboat ready for service. The falls for the second lifeboat to be launched shall be kept in position attached to the davits, but not necessarily attached to the lifeboat, provided that the lower blocks are taken to suitable ring bolts on deck or to strops on the davits or otherwise arranged in such a manner that the falls will not interfere with the launching of the first lifeboat and will be immediately available for attachment to the second lifeboat :—

(ii) *Wood blocks for cordage rope falls.*—Wood blocks for lifeboats of standard proportions shall be as follows :—

Length of Boat not over	Davits in ships of Classes I, II, III, IV, V, VI, VIII, IX, X and XI			Davits in ships of Classes VII and XII		
	Block	Purchase of Falls*	Size Cordage Rope	Block	Purchase of Falls*	Size Cordage Rope
Feet	Ins.		Ins.	Ins.		Ins.
30	. . . . .	13	T & T	3 $\frac{1}{2}$	12	T & T
29	. . . . .	13	T & T	3 $\frac{1}{2}$	12	T & T
28	. . . . .	13	T & T	3 $\frac{1}{2}$	12	T & T
27	. . . . .	12	T & T	3 $\frac{1}{2}$	11	T & T
26	. . . . .	12	T & T	3 $\frac{1}{2}$	11	T & D
25	. . . . .	12	T & T	3 $\frac{1}{2}$	11	T & D
24	. . . . .	11	T & T	3	10	T & D
23	. . . . .	11	T & D	3	10	T & D
22	. . . . .	10	T & D	2 $\frac{1}{2}$	9	D & D
21	. . . . .	10	T & D	2 $\frac{1}{2}$	9	D & D
20	. . . . .	9	D & D	2 $\frac{1}{2}$	8	D & D
19	. . . . .	9	D & D	2 $\frac{1}{2}$	8	D & S
18	. . . . .	9	D & D	2 $\frac{1}{2}$ +	8	D & S
17	. . . . .	8	D & D	2 $\frac{1}{2}$ +	8	D & S
16	. . . . .	8	D & D	2 $\frac{1}{2}$ +	8	D & S

\*T = Triple.

D = Double.

S = Single.

+ = Ordinary quality breaking load 2.2 tons.

(12) *Bollards.*—Suitable bollards or other equally effective appliances for lowering life-boats shall be provided in all cases where cordage rope falls are used. For lifeboats not exceeding 20 feet in length, horn cleats attached to the davits may be fitted in lieu of bollards. For lifeboats over 20 feet but not exceeding 25 feet in length, a double bollard may be fixed to each davit. For lifeboats over 25 feet in length, bollards of the cruciform type shall be attached to the deck, and in the case of lifeboats not over 27 feet in length the horizontal arms shall be not less than 5" in diameter, and sufficiently long to take at least four turns of the largest rope with which they will be used. In case of lifeboats over 27 feet in length the arms shall be 6" in diameter, and not less than 6" in length from the side of the column. Ample lips or flanges shall be provided at the ends of the arms to prevent the fall from jumping off. Fairleads shall be fitted and be arranged so as to ensure that the lifeboats is not lifted during the process of swinging out.

## PART II

[See rule 31 (6) (a)]

### *Lowering Tests*

In ships of Classes I, II, III, IV, V, VI, VII, VIII, IX, X and XI each pair of davits, and, where fitted, the lifeboat winches including their hand and automatic brakes shall be capable of withstanding the following tests—if not more than one lifeboat is suspended from the davits when in the outboard position the lifeboat at each set of davits shall be lowered from the embarkation deck to the water loaded with the usual equipment and a distributed weight equal to the full number of persons for which it measures plus 10% of the total load, including blocks and falls ; if two lifeboats are suspended from the davits when in the outboard position, the heavier lifeboat loaded as indicated above shall be lowered from the embarkation deck to the water while the other lifeboat, with its blocks and falls and loaded with the usual equipment, plus 10% of weight of the lifeboat, equipment, blocks and falls is suspended from the davits. Winch brakes exposed to the weather shall be capable of withstanding the foregoing test with the breaking surface wetted.

## THE EIGHTH SCHEDULE

[See rule 23]

### *Buoyant Apparatus*

(1) Buoyant apparatus shall be capable of withstanding a drop test, the height of which shall be equivalent to that of the deck on which it is stowed above the ship's light water line, but in no case less than the following :—

Apparatus carried in ships of Classes I and III . . . . .	60 ft.
Apparatus carried in ships of Classes II and IV . . . . .	35 ft.
Apparatus carried in ships of Classes V and VI . . . . .	20 ft.

(2) The framework of buoyant apparatus shall be of hardwood, but the wood casing or sparring may be of softwood. The method of securing the corners shall be such as to avoid fastenings into end grain timber. The interior of the apparatus shall be well ventilated. There shall be no projections from the apparatus which would prevent it from sliding easily over a ship's rail during launching.

(3) Grab lines shall be fitted all round the apparatus in such a manner as to provide a number of equal loops corresponding to the number of persons for whom the apparatus is certified. Each loop shall have a cork or light wood float and the depth of the loop when wet shall not be less than 6" and not more than 8".

On apparatus exceeding 12" in overall depth two rows of grab lines shall be fitted, one having its points of attachment a little below the top of the air cases and the other a little above the bottom of the air cases and as close to the sides of the air cases as is practicable. On apparatus of 12" or less in overall depth one row of grab lines may be attached along the line of the middle of the depth.

The grab lines shall be of rope of not less than 1 $\frac{1}{2}$ " in circumference. They may be attached to the apparatus by being passed through holes in the framing and being interlaced to prevent movement, or they may be attached to the apparatus by means of wrought iron or steel fastenings. Whichever method is adopted the attachment shall be strong enough to permit the apparatus being lifted by the grab lines.

(4) Buoyant apparatus shall not exceed 400 lb. in weight unless suitable means are provided to enable it to be launched without lifting by hand. If the weight of the apparatus exceeds 300 lbs. suitable handles or rungs shall be fitted for this purpose.

(5) Buoyant apparatus shall be effective and stable when floating either way up. It shall be capable of supporting a weight of iron, suspended in fresh water from the grab lines,

of 15 lb. per foot of length along any edge (subject to a minimum of 64 lb.) without immersing any part of the upper surface of the apparatus.

(6) The air cases of equivalent buoyancy shall be placed as near as possible to the sides of the apparatus, and such buoyancy shall not be dependent upon inflation. If the buoyancy is provided by metal air cases, such air cases shall be of copper, yellow metal or other durable material and not more than 4 feet in length. If the air cases are more than 2 feet 6 inches in length or breadth they shall be efficiently stiffened by divisions or stays. The air cases shall not be pierced for the attachment of wood divisions or stays. They shall be protected from damage by properly fitted wood casing or sparring and be secured against movement within the casing. No iron work shall be placed in contact with metal air cases.

(7) Buoyant apparatus shall be fitted with a painter.

(8) Buoyant apparatus carried in ships of Classes I and III shall not be less than 3 feet and 6" in breadth.

#### THE NINTH SCHEDULE

[See rule 33 (2)]

##### *Lifebuoys*

(1) The inside diameter of lifebuoys shall be eighteen inches and the outside diameter thirty inches. The major axis of the section shall be 6". The minor axis of the section shall be 4".

(2) The buoyant material shall be covered with good quality material the sewing of which shall be carried out with thread of not less than No. 25A cord.

(3) The completed lifebuoy shall be well coated with paint.

(4) The grab lines shall be of good quality unkinkable line, well secured to the cover by sewing or seizing, and in addition, by bands of a double thickness of the covering material three inches wide around the section of the lifebuoy at four equidistant points, providing four loops of line each not less than two feet four inches long.

(5) The weight of a lifebuoy shall not exceed thirteen and a half pounds.

#### THE TENTH SCHEDULE

[See rule 32 (1)]

##### *Lifejackets*

(1) The buoyancy shall be provided by cork, kapok or other equally efficient buoyant material.

(2) A cork lifejacket shall be capable of supporting sixteen and a half pounds of iron in fresh water for twenty-four hours. The cork shall not weigh more than twelve pounds per cubic foot, and shall be of good quality, cleaned, and in pieces the size of which shall not be less than ten cubic inches.

(3) A kapok lifejacket shall be capable of supporting atleast twenty pounds of iron in fresh water after floating in fresh water for twenty-four hours with sixteen and a half pounds of iron attached. The kapok shall be of the best floatation quality, well tested evenly packed and free from seeds and other foreign matters. At least twenty-four ounces of such kapok shall be in each lifejacket.

(4) The covering of lifejackets shall comply with the following requirements :—

(a) *Kapok Lifejackets.*—The weight of the covering per lineal yard shall be not less than five ounces for width of twenty-seven inches and in proportion for other widths. The threads per inch shall be warp 38 two-fold threads, weft 54 single threads. The sewing shall be carried out with thread not less strong than No. 25 thread.

(b) *Cork Lifejackets.*—(i) If the covering is of cotton material the weight of the covering per lineal yard shall be not less than seven and a half ounces for a width of twenty-seven inches, and in proportion for other widths. The threads per inch shall be warp 42 two-fold threads, weft 29 two-fold threads. (ii) If the covering is of linen material, the weight per lineal yard shall be not less than six ounces for a width of twenty-seven inches and in proportion for other widths. The threads per inch shall be 28 in both the warp and weft.

(5) The tapes of all lifejackets shall be of linen web, one and a quarter inches wide capable of bearing a strain of 200 pounds. The tapes shall be securely attached to the life-

jacket cover. The method of fixing and tying of the tapes shall be such as to be easily understood and capable of being readily carried out.

(6) All lifejackets shall be marked indelibly on one side with a name indicating the design of the lifejacket in the letters not less than one inch in size, and on the other side with the maker's name or other identification mark in smaller letters.

#### THE ELEVENTH SCHEDULE

[See rule 42 (1) and (2)]

##### *Shi.'s Distress Rocket Signals*

(1) A distress rocket signal shall consist of a single bright red star which is projected to the required height by means of a rocket, and which burns while falling, its rate of fall being controlled by means of a parachute to 15 feet per second.

(2) When the rocket is fired approximately vertically, the star and parachute shall be ejected at or before the top of the trajectory, at a minimum height of 750 feet. The rocket shall also be capable of functioning when fired at an angle of forty-five degrees to the horizontal.

(3) The star shall burn with a minimum luminosity of 25,000 candle power for not less than forty seconds. It shall burn-out at a height of not less than 150 feet from the sea level.

(4) The parachute shall be of such size as to provide the required control of the rate of fall of the burning star. It shall be attached to the star by means of a flexible fireproof harness.

(5) The rocket may be ignited by any suitable method. If external ignition by means of a safety fuse is employed the outer end of the safety fuse shall be covered with a metal ferrule primed with match composition and a separate striker shall be suitably attached to each rocket.

(6) The match composition, the striker composition the ferrule and the whole of external surface of the rocket shall be water-proofed.

(7) The rocket shall be capable of functioning properly after immersion in water for one minute and removal of the adhering water by shaking.

(8) All components, compositions and ingredients shall be of such a character and of such a quality as to enable the rocket to maintain its serviceability under good average storage conditions for a period of at least two years.

(9) The rocket shall be packed in a metal container hermetically sealed.

(10) The date on which rockets are filled shall be stamped indelibly on the rockets and on the containers.

#### THE TWELFTH SCHEDULE

(Vide Rule 44)

(Govt. of India Seal)  
Issued by the Government of India.

INDIA

#### INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1948, MODIFICATION OF SAFETY CERTIFICATE.

Memorandum issued under the provisions of Regulation 17, Chapter I of the International Convention for the Safety of Life at Sea, 1948.

Name of Ship	Official Number	Port of Registry

In view of the fact that in the course of the voyage commencing on the \_\_\_\_\_ from \_\_\_\_\_ to \_\_\_\_\_ the above-mentioned ship is not to have on board a number of crew and passengers exceeding \_\_\_\_\_ she is free to carry a smaller life-saving equipment than that stated in her Safety Certificate. In these circumstances, there will be no infringement of the provisions of the International Convention for the Safety of Life at Sea, 1948, if the ship is provided with :—

—boats capable of accommodating \_\_\_\_\_ persons.  
—life-rafts capable of accommodating \_\_\_\_\_ persons.  
—buoyant apparatus capable of supporting \_\_\_\_\_ persons.  
—lifebuoys.  
—life-jackets.  
—Certified lifeboatmen.

This Memorandum is valid only for the voyage specified above. During that voyage it is to be annexed to the ship's Safety Certificate and is to be substituted for Part II (4) of that Certificate.

The undersigned declares that he is duly authorised by the Government of India to issue this Memorandum.

Issued at \_\_\_\_\_ this \_\_\_\_\_ day of \_\_\_\_\_ 19 \_\_\_\_\_.  
(Signature)

Under rule 44 of the Indian Merchant Shipping (Life-saving Appliances) Rules, 1956, this Memorandum must be returned by the Master to the officer from whom it was obtained at the end of the voyage to which it relates.

[No. 52-M.A. (3)/54.]

A. V. SUBRAMANIA IYER, Under Secy.

